Industrial Finishing

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FROM THE EDITOR'S WINDOW

BY THE TIME this issue of INDUSTRIAL FINISHING is delivered, Christmas shopping and planning for the holidays will be at its peak. What a wonderful array of merchandise is displayed in the retail stores to tempt buyers, and how attractively it is displayed!

Back of it all are the factories that produced it—the designers, executives who have had to make decisions, production planners, craftsmen, finishers and, last but vitally important, the sales organization. All factory departments have had to exert co-ordinated effort, mental and physical, toward the one objective—that of producing something that will be bought. What the retail shoppers decide upon this month, will mean much to many factory organizations.

In this connection we are reminded of an article in *Nation's Business* for December entitled "Has Your Business Sex Appeal?" This article points out the significant fact that "woman now spends such an overwhelming proportion (about 80 percent) of the family income that business must recognize her as the chief customer," and that more factories must plan the design and appearance of their products accordingly.

In the summary of "ten outstanding traits of Woman, the Purchasing Agent of the Home," this one is especially striking: "A top sergeant for looks. Cleanliness, appearance, eye appeal, mean more to her than how a thing works. A man selected an auto after weeks of comparison, but didn't buy it because his wife did not like the color of the upholstery."

W. H. Rohr

Managing Editor

What type of primer is best for a pyroxylin finish on metal? Here is a short discussion of this problem on a basis of research and experiment in the du Pont laboratories. Pyroxylin primers may be used under perfect conditions of cleanliness and operation.

Anchoring a Pyroxylin Finish on Metal

Director of Industrial Sales of E. I. du Pont de Nemours & Co., Inc., Parlin, N. J., estimates the relative efficiency of priming coats.

By L. P. Nemzek

A PYROXYLIN finish, designed for durable qualities as well as for beauty, usually will not stick well to bare metal. The hard top-coat will resist weather and wear for the maximum time only if it is anchored to the underlying surface by some intermediate material. The question is often raised: "What kind of primer will best adhere to the metal and bind the top-coat permanently?"

Many years of experimenting by the du Pont Company on primers for use under Duco have proven that a high-bake oil-type primer is the best, in flexibility, adhesion and general durability under adverse conditions. These baking primers, although giving the best quality and durability, require expensive ovens and careful control of time and temperature in application.

For these reasons many finishers desire a primer with which baking ovens are unnecessary. Neither air-drying oil primers nor pyroxylin primers require ovens, and there is much confusion in many minds as to the relative merits of these two air-drying products.

The du Pont laboratories have come to the decision that under perfect conditions of cleanliness and operation there is but little to choose between an air-drying oil primer and a pyroxylin primer. However, where there may be dirty or oily metal, the laboratories have found that the air-drying oil primer is much safer to use. An almost invisible oil film will cause a pyroxylin primer to be ineffective, though it will have little or no influence on the adhesion of an air-drying oil primer.

The Du Pont Company manufactures all three types of primer for use under Duco, and recommends them in the following order:

Pyroxylin Primers—Good
Air-drying oil primers—Better
High-bake oil primers—Best

—*Advertisement*

PRACTICAL TESTS FOR LACQUERS

Foreman Finisher of Store Kraft Mfg. Co., tells what tests he usually makes, or orders made, to determine the relative value of lacquer materials for his finishing jobs

By E. B. Smethers

OCCASIONS often arise in a finishing room that require finishing materials to be tested quickly, without waiting for the usual aging or weathering tests to prove their value. This can be done with some degree of success as regards durability, flowing, rubbing and polishing, by comparatively shorter tests. It is important to make all tests under exactly the same conditions, so as to be as fair to one material or method as another. The less valuable materials can be thrown out and the more worthy ones kept for more extensive tests.

Color; Poison

In this process of elimination, first observe the color. If a pigmented product is under test, it is advisable to let it dry before judging its color, tint or shade. Sometimes the true color cannot be determined while material is in the liquid state. In the case of clear varnishes or lacquers, note the degree of paleness, as this can have an effect on some finishes.

The odor of some lacquers is offensive, and in some cases such odors as come from poisons like benzol can be detected. If dealing with reliable finish manufacturers, this danger of poison thinners is very small, as these concerns are interested in protecting the health of their customer's employes. When testing flat lacquers or varnishes, notice if they produce any change in the original color of the finished product, or whether they partially hide the transparency of the wood grain.

Viscosity or "Body"

We are now ready to test the viscosity, or in other words the body of our material. It is possible to buy a material that is heavier and more viscous than its competitor, but it may be of less value—even at the same or a lower price. This is especially true of the lacquers. The seemingly thin lacquer material may deposit a thicker film when dry than its more viscous competitor, which has to be thinned from one-third to one-half in order to be used successfully in a spray gun.

If a satisfactory film can be produced with two coats of the lacquer that needs no reducing, while three coats of the reduced material is required, it would be false economy to buy the latter material. In figuring your cost per gallon, be sure to take into consideration the number of coats required, the labor, drying time, quality of the film, etc.

The writer will not go into detail regarding the viscosity and specific gravity tests. This is very ably done in the February 1928* issue of INDUSTRIAL FINISHING magazine. While tests made by the viscosimeter and hydrom-

*Pages 76 to 84.

eter are both necessary for some special finishes, the hydrometer reading alone will usually suffice for ordinary practical purposes.

Hydrometer Readings

After you have made sure your material is working properly, take your hydrometer reading at a given temperature. Hydrometer scales are usually standardized at 60-deg. F. As long as the same lacquer or other material is thinned with the same reducers, quite satisfactory results will be obtained. It might be stated here that the temperature of the material and the reading should be calculated back to 60-deg. F.

In using the hydrometer one should be very careful, as there are several things that can cause errors in its use. But I will not go into detail concerning these as this has already been explained (in February article) probably better than I could hope to. It might be added here that its (the hydrometer's) most important use is in the fact that, after finding the proper finishing material and the right amount of reducer for proper working consistency, the readings can be recorded and used as a reference when making up new batches of material.

Working Tests

We are now interested in the application of our material. Panels of wood or metal, according to the type of material to be tested, should be cut of a uniform size. If the product is to be brushed or dipped, try it as in actual practice. If it is to be sprayed, be sure that conditions are uniform for all samples. Try to give each of them an honest test. The air pressure, the gun adjustment, relative humidity, temperature of the material—all these factors have their effect on the final result.

The wood panels, if it is to be a clear finish, should be sponged, water stained, sanded lightly and given a wash coat of shellac; opened grained woods should be paste filled. This filler, if it is to be used under lacquers, should be so constructed as to withstand the solvent action of the lacquer. There are some very good clear wood sealers on the market today of a lacquer type, that can be sprayed directly over the stain or filler. I have used and tested a few of them with very gratifying results.

In testing these materials one should note the sanding, filling and sealing properties, the transparency, the drying, etc. In the case of lacquer enamels, special note should be taken in the tests of its primers and surfacers Watch carefully any signs of softening or raising of these undercoats by the lacquer.

In applying the samples, spray on a full wet coat at the consistency directed by the manufacturer. If slight changes have to be made, make a notation of this fact. Always allow ample time for drying between coats. Notice the amount of overspray, the orange-peel effect and the "build" or thickness of the film deposited by each coat, and try and keep a check on the relative quantities of your various samples used to spray on a single coat or a satisfactory finish. Any blushing should also be carefully noted.

Rubbing; Polishing; Durability

All rubbing and polishing should be checked in a uniform manner, keeping as accurate a check as possible on the time required. Rubbing defects such as pull-outs, heavy scratches, etc., should be

noted. If the surface is to be wet sanded, notice if any of the various products gum up the paper. Observe the ease of polishing and the luster obtained.

Tests should now be made regarding the hardness, adhesion and elasticity. In the case of metal panels, if they are of a light gauge (thin) the elastic and adhesive properties can be fairly well determined by bending the thin metal around a small rod, away from the finished side. This should be done every few days after the finish is thoroughly dry. This will aid in showing whether the undercoats are of the proper kind, and their ability to adhere to the metal and to each other.

By using a sharp knife, one can note the ribboning effect of the material, which would denote elasticity. A short brittle undercoat would chip off in small particles. These are to be avoided. Temperature changes should be made if possible. Note which material shows temperature checks first. These checks are easily recognized in a finish on wood, as they run across the grain of the wood. Humidity checks run longitudinally, or with the grain.

Weather Cycle Test

In case of materials that are to be exposed to the elements, a weather wheel or cycle could be used very successfully, if one is accessible. When the durability of a finish must be determined quickly, I do not wait for the customary weathering process; I send my samples to a reliable manufacturer to be put on the weather wheel.

These tests I think are fairly reliable, but it is well to submit the samples to actual exposure before reaching the final decision as to their durability. It is best to place them at a 45-deg. angle facing the south. Examinations should be made frequently to determine which materials show the effect of the elements first, and in what way.

There are numerous other tests such as acid tests, boiling water, etc., that perhaps should be made for some special finishes, but at any rate when arriving at a decision, consider the cost of the material, the covering capacity, the ease of application, rubbing and polishing properties, durability and total time consumed in the process.

The worthier products can now be tried out in a larger way, gradually eliminating one after another until the most satisfactory material for the job has been obtained.

The problem of all industry today is in its relations with its public, and any consideration of the industry's needs or future activity must be attuned to that problem.

A successful business has got to be built on the foundation of the management's own personality, good taste and service.

DuPont Divisions

The DuPont Co., announces the separation of its Industrial Finishes Division from the Automotive Finishes segment of the Chemical Products Division. Each will be operated independently with Mr. E. M. Flaherty as manager, at Parlin, of the Industrial Finishes, and Mr. G. A. Staples as division manager of the Automotive Finishes at Detroit.

Silk Screen Process Bulletin

Naz-Dar. Co., (mfrs. of silk screen process paints, equipment and supplies for paint and process printing) 4018 N. Rockwell St., Chicago, Ill., has published a folder featuring the Naz-Dar made-to-order silk screen plates for reproductions of trade marks and decorative designs in color. This bulletin is in three colors and has a page size of 8x11-in.

AIRCRAFT FINISHING

Superintendent of Covering & Finishing Dept. at General Airplanes Corporation begins a series of articles covering some of his extensive experience with practical problems of airplane finishing

By George A. Endom

THE MARVEL of the airplane is gradually becoming commonplace. What was formerly considered a hazardous experiment is being accepted generally as a mode of transportation—practical, speedy and safe. Each day more and more ships take the air, and mail and passenger schedules are beginning to mean something.

The public is becoming "air-minded" to the extent of taking passage when time must be saved and distance reached. There was a time when passenger flights were taken only for a thrill, and many looked at the airplane as a foolhardy means of overcoming boredom.

Air Pioneers

Our air pioneers are chiefly responsible for the increased interest in aviation; and the licensing of pilots, mechanics and ships by the Department of Commerce has also done much to bring the confidence of the public to a point where even the most skeptical are forced to admit that the airplane is here to stay.

Now, pilots must be competent enough to pass the Department of Commerce test; field mechanics must also pass a test of competence; and every airplane manufactured must be registered by that body before it can be flown any distance. This has eliminated the irresponsible "barn-stormer," prevented many accidents, and done much to stabilize an industry that has struggled for some time.

Speaking of air pioneers does not alone mean Lindbergh, Chamberlin, Byrd, and the other intrepid heroes. All the homage and tribute they can get, they deserve. There is not one individual connected with the aircraft industry who desires to detract an iota from their feats of valour. But

The airplane pictured at top of this page is a three-passenger "Aristocrat," built by the General Airplanes Corp., Buffalo, N. Y. The body is finished in two tones of green. The top surfaces of wings and and tail are deep yellow; the under surfaces are light green.

it must be remembered that for every flight a ship must be provided, and unless this ship has the efficiency of design and has conscientious labor in its construction not many long distance flights would be recorded.

A Great Opportunity

This brings us to our reason for these articles! Because Aviation is awakening from its torpor and at last is going on a productive basis, there is a great need for experienced personnel.

Just as everyone wanted to be a chauffeur when the automobile industry was new, many are now rushing to obtain pilots' certificates (many of these are better fitted for other vocations) until, as in the automotive field some few years ago, there will be more men to guide ships than build them.

The writer is of the opinion that there is a great opportunity in aviation for anyone who is willing to work unselfishly and honestly for rewards that will naturally follow perseverance in any business. My experience and observation has shown me that there is a dearth of leaders in aircraft construction. This is especially evident in the finishing end of this work, for a good finishing foreman in aircraft must have a specialized knowledge of several lines.

Finish Is Important

He must know protective finishes for various metals, and how to apply them. He has to know the safest and fastest method of stretching special fabric over the parts that get covered. When the fabric is permanently in place, the foreman finisher should know the best protective coating to apply—and how to apply it. There are many grades of coatings on the market today and the good must be separated from the bad.

And finally, the appearance must be considered. This is a matter that has come in for considerable discussion since aircraft entered the commercial field. Years ago performance was the only thing considered. To-day competition is stronger, and an airplane having superior design and performance but presenting an unfinished appearance will not be purchased as readily as one that has inferior flying qualities, but has the finish of a custom-built automobile.

It has been my good fortune to have had considerable experience in aircraft finishing and, believing that one cannot do a job well unless he knows why he is doing it, I shall attempt to give the specialized knowledge that it has taken years to acquire to the readers of this magazine, and I am confident that anyone desiring to enter the business of aircraft finishing will find a considerable number of facts that will be of value.

What to Expect

All of the information following is practical. It follows Air Service Specifications in many instances, and approved commercial practices found by experience to be the best methods of producing finished airplanes. Theory will only be given when explaining reasons for certain

The CK-2A, an early design training plane built for U. S. Army in 1925 by Cox Klemin Aircraft Corp.

operations. Where sketches are necessary same will be given and where more than one method is used and found satisfactory, the several methods shall be explained.

I hope that everyone reading these articles will find them as interesting and informative as they were to me, learning them by experience and diligent labor.

New Reasons for Gray Pores

The cause of gray pores is often very hard to locate. I know of one concern being troubled with gray pores which were caused by the water they were using in the water-stain powders. When they mixed their stain they used hydrant water—a lime-rock water. This water would mix the stain thoroughly, but after standing for any length of time, the stain would separate and curdle.

In case the stain was used immediately after it was mixed, it appeared to be satisfactory, but after the surface had been filled and lacquered and had stood for about three days, the pores would turn gray. The cause of this was the water they were using, which contained too much lime and iron; therefore in mixing water stain powders, use soft water (rain water or chemically softened water) to secure a permanent stain.

Other causes of gray pores are due to the use of water putty. The putty must be thoroughly dry before sanding. In some factories it is customary to sand off the puttied surface with a belt sander; if the putty is not bone dry it will carry along on the belt and fill the pores in the wood. Such woods as rosewood, zebra, mahogany and vermillion are the most susceptible to this, but it seems to show up in rosewood more than any other.

Always let the puttied places stand overnight before sanding them off, because they are sure to turn gray if the putty is not hard and dry. Therefore, it is not always the filler that causes gray pores.

If these two points are checked when investigating the cause of some gray-pore trouble, perhaps they will provide a short cut in finding the real reason behind the defect known as gray pores."—B. J. Studer.

It is obvious that your best customers are your competitors' best prospects.

Dependable and efficient cooperation with its customers should be a firm's constant aim.

Book of Industrial Cleaning

A new 37-page booklet, copyrighted and published by the E. F. Houghton & Co., Philadelphia, Pa., describes in detail methods of using the company's product "Houghto-Clean", which is adapted to practically every industrial cleaning job. The booklet will be sent free of charge to those interested.

DuPont Advances J. J. Moosman

The DuPont Co., announces that Mr. J. J. Moosman has been appointed assistant general manager of the Paint, Lacquer and Chemicals Department to fill the vacancy caused by the death of Mr. J. W. Elms.

Formerly, Mr. Moosman was manager of the Chemical Products Division with headquarters at Parlin, N. J.

New Spray Equipment Catalog

The Sharpe Mfg. Co., 1354 So. Flower St., Los Angeles, Calif., is distributing a new 12-page catalog and extra buletin sheets (page size 8½x10½-in.) illustrating and describing a varied line of spray equipment, which includes spray guns, hose, filters, regulators, fans, connections, fittings and complete spray-painting outfits.

UNIFORMITY — QUALITY — PERMANENCY

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A Chinese Finish Centuries Old

A priceless set of furniture made for a Chinese Emperor, centuries ago, had a thick durable finish that modern removers wouldn't touch

By C. Dan Youngs

INDUSTRIAL FINISHERS of today, and manufacturers of industrial finishes pride themselves, and rightly, upon the development the industry has shown within the past 20 years. Great advancement has been shown in the art; beauty of finish and ease of application have been improved, but one test has not yet been completed—the test of time. Will the present day finish still wear well and look well four centuries from now? Probably not. We of today, are not building to such an extent for posterity.

Recently the Artcraft Decorating Co. of Oakland, Calif., had in their shop a set of furniture consisting of a three-part table, chairs and buffet—seven pieces in all—which was finished between 350 and 400 years ago.

An Emperor's Furniture

Ta Ming Kwoh, Emperor of the Ming dynasty in China had wonderful furniture in his palace. Furniture made for the Emperor's palace took scores of years for completion; fathers worked with sons and the sons grew up and their sons worked with them—all upon the same sets of furniture. A few handfuls of rice and a few pipes of opium satisfied their physical needs, but spiritually they were bound up in the fact that they were creating something for their "Illustrious Emperor." And so, priceless furniture came into being, born from bondage and bodily labor, and shaped and fashioned with the loving care to detail that only skilled craftsmen can give.

Time went on and Ta Ming Kwoh realized that his dynasty was about to fall before the onslaught of the Manchus, and he was forced either to flee in poverty or remain subject to the whims and tortures of the Manchus. He therefore disposed of his household goods and furniture wherever he could, and the set above referred to was placed in the hands of a merchant for disposition.

It was bought and sold many times until at last, through stress of circumstances, it became part of the household of an ignorant coolie in a cluttered-up street of an ancient city. By chance one day an American lady, on the lookout for works of art, chanced upon the alley where this coolie lived. Seeing a part of this set she bargained for it and finally secured it for a ridiculously small sum. She had it shipped to her home in Piedmont, Calif., where it has been ever since. So highly is this set appraised that she carries a $15,000 insurance policy on it.

Ancient Construction

This set is worth the careful study of any collector or connoisseur of antiques, especially

Pee Gee

PALE POLISHING VARNISH

No. 420

Here is a polishing varnish that every reader of Industrial Finishing should know about–we'll send you a free sample. In forty-eight hours it is ready for rubbing. Can be rubbed to a subdued dull finish or to a high polished, permanent finish. It accentuates the beauty of the grain—it will not print.

Send for free sample

PEASLEE-GAULBERT CO.

Incorporated

Louisville, Kentucky

VARNISHES STAINS FILLERS
LACQUERS ENAMELS

the finishing. It is made of mahogany dyed "yewood" with ivory inlay, and the parts are held together with handmade nails and wooden pegs. These nails, heated and shaped by hand, finally became rusted with the passing of time, although the hand-made wooden pegs still held together as firmly as when placed.

Mystery Finish Durable

Because of this rust, and in order to preserve the set, it was necessary to have it re-built; during this process the original finish naturally had to be replaced. This original finish, composed of no one knows what, was more than $\frac{1}{32}$-in. thick. When the Artcraft Decorating Co. attempted to remove it with paint and varnish remover, and lacquer thinner, neither had any effect; neither softened it up the slightest. It was necessary to scrape it off carefully, so as not to mar the exposed surfaces. The scrapings had a slight unrecognizable odor, and were a rich mahogany color.

The set was shown to an old Chinaman who tried to explain in pidgin English how this finish was applied. He said it was often a matter of two or three years before the finishing job was completed. Each coat was carefully brushed on and allowed to set for 30 to 90 days before being rubbed, and then the next coat was applied. He could not tell how many coats were applied, but shrugged "Two-three years." But with the finish 400 years old and still more than $\frac{1}{32}$-in. thick, it is certain that there were many coats applied.

Some present-day finisher, who is a student of the antique, may be able to throw some light on what the finish was, that neither paint and varnish remover, nor lacquer thinner would soften in the slighest degree. If so, there is many a manufacturer of finishes today who would like to know the secret.

Exhausts for Fumes

The top floor has a great many advantages as a finishing room. Ventilators can be put in the roof, the number depending on the size of the room and the quantity of gas to be carried off.

These vents will take care of most light gases that arise. The heavier gases that are given off by the evaporation of benzol, benzine, naphtha, etc., sink to the floor or follow the elevator shaft or other passage down to the lowest level, and they may even reach the boiler room with disastrous results, unless proper floor exhausts are installed. In the case of lacquer fumes, suitable exhaust booths should be constructed.—E. M. Streth.

Binks Co.'s Missouri Branches

Binks Spray Equipment Co., has opened new branches at 419 Chemical Bldg., St. Louis, Mo., and 305 Grand Avenue Temple Bldg., Kansas City, Mo.

H. M. Johnson to Roxalin Co.

Mr. H. M. Johnson formerly president and general manager of Johnson, McKim Johnson Co. of Linden, N. J., is now affiliated with the Roxalin Flexible Lacquer Co., Inc., as a member of the technical staff.

Lacquer Color Booklet

The Pecora Paint Co., 3501 N. Fourth St., Philadelphia, Pa., has published a booklet entitled "Pecolac Recommendations" that contains lacquer enamel color charts and recommendations for industrial, automotive, architectural and furniture purposes. The booklet has 16 pages of 3½x8¼-in. size inside the cover.

COMPARE!

Our Materials With Others

Lacquers Walker Service with Walker **Enamels**

Have You Tried Our

Ground Coat Lacquer

For Grained Effect on Wood or Metal?

Oak
Walnut
Mahogany

Light
Medium
Dark

A good substitute for baked enamel ground coat, and much clearer

Method of Application Sent upon Request

Henry V. Walker Co.

17 John St. New York

Factories, Elizabeth, N. J.

Dipping and Whirling Small Articles

Describing a rapid and economical method of lacquering small articles in bulk, by means of a standard type of washing machine

By M. C. Roberts

ONE OF THE finishing problems in industry today is to efficiently and economically apply finishing coats to small articles and parts, such as toys, golf tees, typewriter and telephone parts. For this class of work I have taken it upon myself several times to recommend what I term the "twirling method" of applying finishing coats and, in every case where the method was adopted, it has proved to be entirely satisfactory—filling all requirements of economy and efficiency.

Use a "Laundryette"

There is a washing machine known as a "Laundryette" that I have used and which I generally recommend for use in the "twirling method" of finishing. The machine is of the regular washing machine type in outward appearance, but it has a central vertical shaft on which is fitted an inner chamber. This inner chamber is completely perforated with holes 5/16-in. in dia., it can be raised, or lowered to the base of the outer chamber, by means of a foot lever.

The articles to be finished should be thoroughly dry and clean. If they are metal, it is recommended that they be cleaned with a lacquer solvent cleaner, and then thoroughly dried before the actual dipping operation.

Method of Operation

Dipping lacquers are usually shipped at a fairly heavy consistency and generally they require some reduction before they can be used.

The lacquer, after having been reduced to the proper body for dipping (sometimes best determined by Baume reading), is placed in the machine. The "tub" is filled with lacquer to the point where the inner chamber containing articles to be coated can be lowered into the lacquer to completely immerse the articles.

The inner chamber (which holds articles to be dipped) is allowed to remain immersed in the lacquer for about a minute; then it is raised by the foot lever attachment and held in this raised position for about a minute, during which time much of the excess lacquer drains out through the perforations. After this minute of draining, the inner chamber is started rotating by motor power.

The centrifugal force of whirling throws off the remaining excess lacquer, leaving an even-thickness coating on each small article, and drying this lacquer coat very rapidly. The whirling is stopped after a very short time and the inner chamber is moved by hand to separate the small articles that appear to be joined together by lacquer.

The chamber is then rotated again for about three minutes, after which the lacquer coated articles are dry enough to handle. In the coating of small metal parts such as those used on typewriters

and telephones, where usually a black color is used, this twirling operation generally produces a satisfactorily finished product, except where a high luster is required.

When lighter colors having less covering power than black are used, it has been found that after the first twirling operation is completed, if the inner chamber be again immersed into the lacquer and the operation is again repeated, that complete and adequate coverage will result.

Finishing Wood Articles

When the articles to be coated are of wood, it has been found advisable to first give them a preliminary tumbling in sawdust to smooth the surface and knock off the rough edges or nibs of wood before the actual coating operation begins.

After the entire coating operation has been completed, if the finished pieces are placed in a tumbling barrel and rotated with strips of newspaper, a fairly high luster will result; if a small amount of wax is placed in the barrel a more lustrous finish will be obtained.

Metal; Lacquer

When and if the articles to be coated are of metal, it has been found that if they are first heated to about 70-deg. F., or kept in average room temperature for a short time, that better results will be secured.

The trend of finishes today is decidedly toward lacquer both in view of durability, general appearance of finish, ease of application and the fact that such equipment as drying ovens are unnecessary. The type of lacquer recommended for finishing such articles as those just described is one formulated along true nitrocellulose lines. The lacquer should be so constructed that the plasticizing medium is either included or omitted, depending on whether the articles are wood or metal. The general structure of such a lacquer product would include nitrocellulose, solvents, diluents, gums and plus or minus plasticizer. In view of the general shape, size and weight of each article, the lacquer is reduced with a special lacquer reducer to the proper consistency for dipping.

Expert Spray Operators

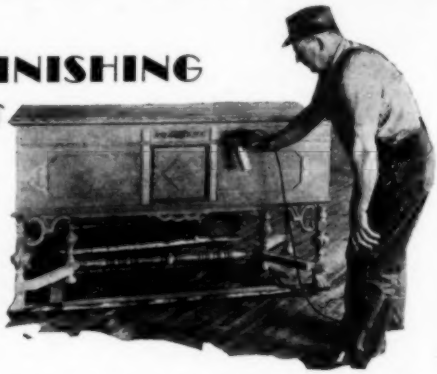
The writer has found the spray system of finishing to be very advantageous in many ways. One important feature is this: In our finishing room, there were only two expert men with the brush, that is, men who could flow on the finish satisfactorily. If one or both of the brush experts were sick or absent, production in this department was held up.

Every foreman finisher knows what a big job it is to break in a new man to do high grade brushing, but in a comparatively short time, a man can be trained to handle the spray gun expertly, if he is at all adapted to such work.

At the present time, although each spray operator is stationed regularly at his booth, there are three men with other duties to perform, who are just as expert with the spray gun, so that they can step in at any time and take a spray operator's place.—E. S. Mathews.

By far the most important factor in the production of any product that has earned a reputation for quality, is to see that this reputation is maintained.

Spray Finishing Methods



Explaining how to use the spray gun effectively and economically; also what conditions to insist upon in regard to keeping the booth and exhaust equipment clean and free from unnecessary fire hazards

By R. F. Daniels

IN THE majority of factory finishing rooms an expert spray man and helper work at each spray booth. Ususally it is the duty of the helper to dust off the article with an air duster before it is sprayed and then remove the article that has been sprayed or, if the article is particularly large, to help the spray operator move it clear of the booth.

Condition of Surfacer

In spraying, the most important thing, next to proper handling of the gun, is to have the surfacer—whether shellac, varnish or lacquer—of the proper consistency to flow freely onto the article being sprayed. If your surfacer is too thick, it will not atomize properly and it will not flow on evenly; if it is too thin it will run and sag, as it hasn't the proper adhesive qualities to "stay put."

Next in importance is proper air pressure. For most of the ordinary wood finishing I prefer between 55 and 75-lbs. air pressure to properly atomize the surfacer. If the air pressure is inadequate the material will show an orange peel effect. Too much air pressure will cause the surfacer to atomize while still in the air, the thinner evaporating and causing a wastage of material; if one is using a lacquer powder surfacer, it will spread all over the booth.

The secret of successful lacquer application lies in flowing on the lacquer wet. As a rule, it is better to use too much thinner than not enough, but not so much as to cause runs and sags. Whenever a lacquer film cracks, checks or fails to dry, it is a positive sign that:

1—The surface was not absolutely clean;

2—Full drying time was not allowed for the undercoats, or;

3—Oily under-surfacers were used.

Another trouble often found is pinholing caused by: (1) improper filling, (2) imperfect sealing of the wood or, (3) the use of a cheap lacquer with too high a percentage of low-boiling solvents. When lacquering on a damp day, the lacquer may not dry properly or it may turn gray. The addition of about a pint of retainer to about five gallons of lacquer will often eliminate this trouble. In 90 percent of the cases, grayness or damp film in the surfacer will eliminate itself in the course of

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Are especially constructed to fit the requirements of furniture manufacturers—high-grade materials that give a most desirable finished surface at minimum production costs. Amerilac Lacquers are easily applied, smooth flowing, quick drying and require little sanding.

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drying, if the articles are placed in a well heated and ventilated room.

Spray Gun Operation

The operation of the spray gun is simple and is easily learned by the average workman. The equipment is connected as follows: The air hose is connected from the air connection on the air system to the side or end connection of the gun. The difference between the air connection and the fluid connection on the gun is that the air connection contains a screen while the fluid conection does not. After connecting the air and fluid connections, start the compressor to "pump up" air pressure in the tank. The air pressure is then regulated to meet the varying conditions—the size of the gun nozzle, weight and viscosity of the surfacer, and the speed desired. The air pressure of the nozzle should be just sufficient to atomize the surfacer.

The spray gun is generally held from 8 to 12-in., from the surface being coated, and is moved back and forth with smooth even strokes. For ordinary work it is customary to adjust the gun to give a flat fan-like spray. Always start at the bottom of the article and work towards the top, doing one "face section" at a time. By "face section," I mean the part facing the operator as he works. When spraying the top of any piece of furniture, start at the near edge and work toward the farther edge. If one begins spraying at the farther edge and works to the near edge, a certain amount of the atomized surfacer will drop onto the surface already sprayed and may cause a pebbly effect which is very difficult to rub out.

It is a good practice, though not a necessity, in spraying "to follow" the grain of the wood. The thickness of coating and the speed of operation can be varied as desired by adjusting the regulators on the spray gun. The spread and volume of the spray is easily varied during operation, by changing the finger pressure on the trigger.

Spraying can also be done with compressed nitrogen, which is better suited than any of the gases commercially available, as it does not burn like hydrogen, nor does it support combustion like oxygen or compressed air. It does not have the rapid cooling effect of carbon dioxide, which chills the sprayed material.

The following extract from "Pyroxylin Finishing Processes" by E. Schuenemann, chief engineer of the Western Factory Insurance Association, is recommended as particularly good practice in connection with lacquer spray finishing.

Good Housekeeping

"Spray booths, including the space behind baffle plates, should be cleaned out daily. Vent pipes and stacks leading from spray booths should be cleaned out as often as deposits on the interior demand; if the certain interiors cannot be reached readily, proper clean-out doors should be provided. The cleaning of booths should be done with copper or brass spuds or with stiff fiber brushes. Waste materials which have been scraped, brushed and swept out should be immersed in water in metal receptacles and removed from the premises.

"Sprinkler heads inside spray booths must be kept clean. If spraying is done in extra large booths or in tunnels or spray rooms, ventilating fans should be kept running during the noon hour

What Every Lacquer User Knows

It isn't the cost per gallon that counts, it's the cost per square foot of finished surface

THE finishing foreman wisely insists on lacquer containing ample quantities of Butanol.* His experience has proven that Butanol* guarantees not only ease of application under varying atmospheric conditions but also a finished surface requiring minimum sanding and polishing; all coats are completely united and, wherever necessary, touching up can be accomplished without difficulty.

Butanol* in lacquer thus gives speed and simplicity to the finishing operations—it reduces labor and overhead charges, guaranteeing lowest cost per square foot of finished surface, and—*lacquer containing Butanol* costs no more per gallon.*

*and its derivatives

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and for thirty minutes after production stops.

Equipment Inspection

"Equipment should be inspected and if any of the following weaknesses exist, they should be corrected: If any booths now in use are made of combustible construction, their use should be prohibited at once. Nothing but incombustible booths should be tolerated. Motors should not be permitted inside of spray booths; fans inside of booths are not desirable, but if unavoidable, care should be taken that the blades are kept clean, that they have plenty of clearance and that the fan is driven by belt or extended shaft with motor outside of the stack or pipe.

"Sprinkler heads should be installed in each booth. No knife switches or snap switches for lights should be permitted inside the booths. Close-up lights should be in vapor-proof globes.

"Exhaust stacks should be clear of all woodwork where they pass through walls, roofs or floors; they should be treated the same as furnace stacks, for when fire occurs in spray booths, these stacks become red hot. Stacks and vent pipes should be equipped with open sprinklers (without fusible links) and controlled by manually-operated valves.

"Roofs in the vicinity of the discharge points of vent stacks should be cleaned regularly as the collection of residue in these localities can easily produce conditions favorable to a bad fire. Containers of pyroxylin enamels to feed spray guns by gravity must never be hung by combustible cords. Wire cables or metal rods are required.

"Air supplied by fans for blowing out and exhausting booths should be drawn from outside—never from dust producing departments. Exhaust pipes from spray booths should be individual and should not be manifolded into long horizontal pipes and thence into large stacks. Such grouping of booths and manifolding of pipes results in fire flashing from the point of origin to all the booths and producing a widespread conflagration. A careful check-up of the existing equipment and its manner of operation is advised, and if any of the above hazardous conditions or faulty equipment exist, a fire may be looked for at any time.

Chair Finishing

Operating Conditions

"Alternating the use of pyroxylin enamels with naphtha and oil-base stains, ground coats, etc., is dangerous, for the alternating deposits of these two entirely different materials produces a dan-

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Our entire technical staff is devoted exclusively to original creations in finishes. Have you a finishing problem?

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gerous residue in layers. Booths used for pyroxylin enamels should not be used for other purposes. Rags, waste and other wiping material are dangerous if allowed to get past the fans and lodge in the vent pipes and stacks.

"Stock should not be stored in front of or allowed to accumulate in front of and close to spray booth operations, as the first blast of fire is sure to ruin such stock, which in itself contributes to the fire. Pressure containers for pyroxylin enamels should never contain more than a day's supply, and air pressure should be released from them at night.

New Equipment

"The location of new departments involving pyroxylin-base finishing operations should receive careful consideration. They should be segregated as much as possible and so located that fire and water damage occurring therein will not menace other departments. The design and arrangement of new equipment should be carefuly planned and analyzed to see that none of the defects and hazards outlined above are incorporated."

Bridging of Lacquer

A number of finishers use shellac as an undercoat for lacquer. Shellac, ordinarily, is a reliable and satisfactory undercoater for this purpose, providing it is of a high grade and is pure. Often when lacquer bridges, the lacquer is naturally first to be considered at fault, but I have seen cases where shellac was the troublemaker.

In one particular case, the shellac that was used had too much "wad" in it. Sometime after application it would appear to be dry, but when sanded it would "gum up" the sandpaper, even after drying for three days. I do not believe that such a shellac would ever get "bone dry." When the lacquer was applied it would raise the shellac in a "bridge" in all inside square corners such as are found on turned legs, corner posts and at shaped places where shoulders occur.

If you are having this trouble, experiment with shellac first; next try a straight lacquer finish, omitting the shellac, and then use a good substitute shellac in another test. From these trials you will probably find materials that will eliminate the bridging defect.

Lacquer seldom bridges on its own account; if it does, it must be a very cheap or poorly made product, for it is my opinion that a good lacquer will not bridge. In most cases I believe you will find that it is the undercoater that causes the bridging "disturbance" in the finishing department.—B. J. Studer.

Values are born from standard production.

Often it is safer to assume that shaded prices mean shaded quality.

An accurate timekeeping system saves, by the job and by the man—one of the manufacturer's primary expenses.

Flexible Shaft Equipment Catalog

The Stow Manfacturing Co., Inc., Binghampton, N. Y., has published a new catalog of twelve 8½x11-in. pages that contains engineering data and illustrates grinding, buffing, polishing, drilling, sanding and brushing machines that are equipped with flexible power shafts and driven electrically.

Now it can be done

Lacquer Speed + Varnish Effect

When Murphy Flexible Lacquers were introduced in August, 1927, they were accorded an instant acceptance by those to whom they were demonstrated. And since then, through the publicity and reputation they have gained, have won over to their use a fast increasing number of prominent companies.

For, at one stroke, these remarkable Murphy Flexible Lacquers have combined into a single material the obvious advantage of lacquer speed with the equally obvious finer finish of varnish. More than that, the other desirable qualities of lacquer and the other desirable qualities of varnish have also been retained in these astonishing lacquers.

Just a few of the high points in the characteristics of Murphy Flexible Lacquers are given here. Consider the advantages you would get in adapting such a material to your own production.

Here are the facts:

1 The basic ingredient of Murphy Flexible Lacquers is not nitrocellulose.
2 They build far better than lacquer.
3 They rub with a pull like varnish, instead of sliding as lacquer does.
4 Polish—we have never seen, even with varnish, a polish of higher brightness. And, unlike lacquer, the finish increases in clarity as it ages, instead of fogging.
5 They toughen with age, instead of chalking and checking.
6 Like varnish, they have a plastic resistance to the expansion and contraction of wood—a notable failure of the rigid finish of nitrocellulose lacquer. They are unaffected by humidity-checking, so much deplored in lacquer.
7 They give the appearance and "feel" of varnish instead of the cold, glass-like surface of lacquer.
8 They are waterproof.
9 They dry as quickly and wear as long as lacquer, but look and act like varnish.

We shall be glad to send to anyone interested more complete information or to arrange for a demonstration.

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Murphy Flexible Lacquers include a remarkable new *flat lacquer* which saves half the cost of sanding, compared to ordinary lacquer.

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Air-drying and Baking Varnishes
Enamels, Lacquers and Stains for Brushing and Spraying and Dipping

New Finish for Railway Equipment

Calling attention to the specific requirements of a finish for railroad cars, street cars and busses, and revealing some of the characteristics and methods of using a new finish developed for this kind of equipment

By L. F. Worlendar

AMONG the many questions connected with transportation, none perhaps is any more important than the protection of equipment and rolling-stock. Such equipment represents an investment of millions of dollars which must be preserved, not alone for its intrinsic value but also because the earning power of this investment depends upon the number of passenger-miles, or ton-miles, the equipment can produce before it is scrapped.

Paint, varnish, lacquer and similar coating materials play a very important part in keeping rolling stock in rolling condition and in preserving other equipment, whether that equipment is made of wood or steel. Without a protective coating, wood absorbs moisture, warps out of shape, loses its mechanical properties, becomes unsightly and eventually deteriorates completely.

The decay of iron and steel, if natural agencies are allowed to act on them freely, is even more rapid than that of wood. Iron and steel are being used more and more in creating the masterpieces of engineering, such as locomotives, coaches, bridges, docks, etc., and the permanence of these structures, to say nothing of the safety of people in and near them, depends upon the success with which corrosion can be prevented.

Two or three kinds of long oil enamels have been used with success to a considerable extent in the railway industry. One of these is made by a secret process, perfected in Holland, and is said to possess greater life, elasticity and durability on heavy-duty equipment than any enamel system yet made. While it is somewhat slower in drying than lacquer, it can be applied one coat a day and may either be brushed or sprayed.

Characteristics of Finish

Now, an entirely new type of finish, has been perfected by one of the leading manufacturers of finishing materials. This material not only dries rapidly enough to permit a schedule practically as fast as lacquer, but it also has remarkable spreading qualities, it is easy to rub and polish and, it does not chip around joints, bolt heads, mouldings and on wooden members.

This is a paint material, yet its behavior is so different from the ordinary type of color varnish or finishing varnish that it would hardly be recognized as a paint material, except by the complete absence of all odors usually found in lacquers.

It is said to be manufactured over an entirely new principle of paint making that permits the finish to dry from the bottom out instead of from the top down, as do ordinary paint and varnish

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Moreover, we are constantly developing new products with which we are successfully meeting the increasingly exacting standards of modern industrial finishing.

We specialize particularly in Lacquers: Clear, Rubbed Effect and Colored.

And in Paragon Rubbed Effect Varnishes: Flat, Velvet and Semi-Bright.

Our corps of long experienced specialists are always ready to serve you.

Your Problems are Our Business

THE CLEVELAND VARNISH CO.

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materials. As a result, checking and cracking, which were the big faults with the old color varnish system of finishing, are entirely eliminated.

There is no hardened top film to check and crack when the bottom portion becomes dry or when the body is subjected to sudden changes in temperature or other severe conditions.

Rapid Drying

The new finish is also remarkable for speed of drying, beauty of finish and durability. One material serves the purpose of ground color, color varnish and finishing varnish, as used in the old days before lacquers came on the market. A coat may be applied each 30 or 60 minutes, which is as frequent as lacquer should be applied, and which permits of working continuously around the street car or bus body. If desired, all of the coats may be dried at one time without danger of cracking, checking, crazing or other defects which usually accompany rapid finishing.

Rubbing and Polishing

After the coats are dry they can be rubbed with pumice stone and water, sandpaper and water, or with one of the trade-marked rubbing compounds now on the market. Following this a beautiful polish can be secured with rottenstone or with one of the lacquer polishing compounds. In short, the rubbing and polishing operations are identical with those on lacquer, but the time required for these operations is claimed to be much less.

If it is not desired to rub and polish the surface, and if a very high luster is wanted, a coat of clear material can be applied after the last coat of colored material has been sanded smooth. This is a distinct advantage where a high gloss is wanted, for it has been proved quite impractical to apply finishing varnish over lacquer enamel under production conditions and secure a durable finish.

For commercial bodies, where the mirror-like smoothness that is demanded on motor car bodies is not necessary, the colored finish can be left just as it dries, or it can be easily and quickly polished to a considerable luster with a lacquer polish without first rubbing or sanding. Colored finishing coats are also made, which dry with a reasonable degree of luster without any rubbing or polishing or without the use of a clear finishing coat.

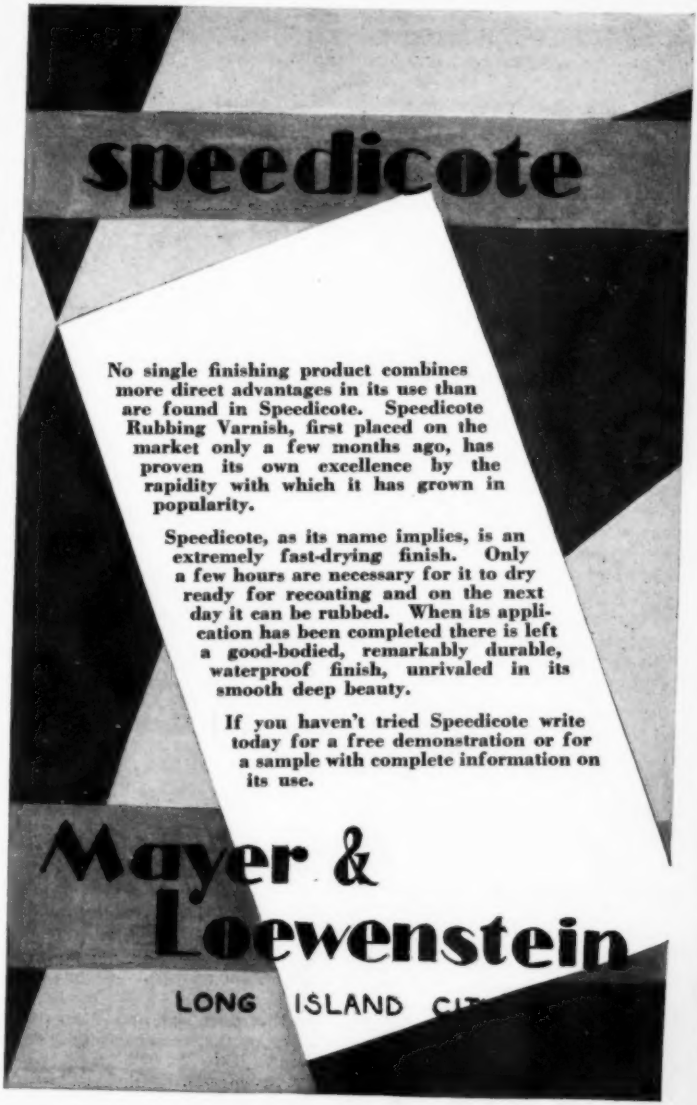
Hiding Power

This new metallic finish has such good filling properties and hiding power that only two coats are required for most work, and never more than three coats. It can be piled onto the work heavily without danger of running or sagging, and the extra thickness of the film reduces the danger of rubbing through the color on sharp corners or edges. It rubs and sands easily and rapidly, and the final result is so nearly like that obtained with a lacquer enamel that many people cannot tell the difference between them.

Because of the extremely good adhesive qualities, the great flexibility and the affinity of the various coats, this new finish is as durable on wood surfaces as on metal. So far as I can learn these same good qualities of adhesion and elasticity make this new finish well suited for use on long wheel-base equipment that is subjected to continual stress and strain due to weaving on uneven road surfaces.

Satisfactory Service

One railroad has finished about


speedicote
No single finishing product combines more direct advantages in its use than are found in Speedicote. Speedicote Rubbing Varnish, first placed on the market only a few months ago, has proven its own excellence by the rapidity with which it has grown in popularity.
Speedicote, as its name implies, is an extremely fast-drying finish. Only a few hours are necessary for it to dry ready for recoating and on the next day it can be rubbed. When its application has been completed there is left a good-bodied, remarkably durable, waterproof finish, unrivaled in its smooth deep beauty.
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Mayer &
Loewenstein
LONG ISLAND

50 refrigerator cars and expects to eventually refinish all of its refrigerator cars by this system. An electric railway has several street cars finished with this material and the paint foreman says that they are entirely satisfactory. A number of automobile bus bodies are giving excellent service after many months exposure.

Striping and lettering on bus bodies, street cars, etc., can be applied with japan colors in the usual way, when a clear coat of the new finish is used as the finishing coat. Gold leaf work can be applied in the regular way and pencil-varnish with a clear coat of this material.

Silk Screen Stencilling

Stencil printing of ornamental design on metal, wood, cement, paper or fabric surfaces by the silk-screen system is performed differently than ordinary stencil printing.

The printing or stencil frame consists of four pieces of wood put together according to the size contemplated for the design. The larger the frame the heavier the wooden pieces will have to be, although an average size of 1x1¼-in. should do if the corners are reinforced with metal braces.

This frame is covered with ordinary silk bolting-cloth of fairly close texture and weight. As all silk fabrics are liberally sized and weighted to give them substantial properties, the cloth should be laundered before being tacked to the frame. Laundering will promptly relieve the fabric of any foreign substances which may have been put into it by the manufacturer, leaving the texture flexible, open and natural, which is the condition required for satisfactory stencilling.

The printing stencil consists of a slender wooden frame across which fine silk bolting-cloth is fastened.

Showing a design traced on the silk bolting-cloth.

A separate frame will be needed for each design intended to be printed and for each color in the design. After the fabric has been stretched smoothly across the frames and tacked down, the outline of the design to be produced is traced on the silk bolting-cloth with a lead pencil or chalk. A single tracing will be sufficient for a one-color design, but a separate tracing on a separate frame will be necessary for each additional color.

Portions of the bolting cloth which are not occupied by the design, are made "solid" with a heavy varnish.

The design is blocked in by applying a heavy coating of col-

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who has thoroughly tested out PENTASOL and PENT-ACETATE in his lacquer formulation has double checked and put his enthusiastic O.K. on them as safe, pure lacquer solvents. These users of Pentasol and Pent-acetate have found that lacquers incorporating these solvents are of finer quality—have greater resistance to blushing and orange peel effect—have higher gloss and better levelling.

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501A FIFTH AVENUE, NEW YORK

lodion, varnish or shellac on the portions of bolting cloth not occupied by the design. The filling-in process completes the stencil, and it can be used as soon as the ground covering is dry. The accompanying drawings show the stencil frame, the marked outline on silk and the final blocked stencil.

Quoting from Mr. Frank S. Chance's article on this subject in June issue,

"The paint differs from ordinary paint in that it is ground finer and is in paste form. It dries flat within two hours.

"The only tool needed to force paint through the open meshes of silk onto the surface to be printed is a squeegee—a piece of rubber ¼-in. thick, mounted in a wood holder. The operator simply dips up a quantity of paint paste with the squeegee and pulls this over the surface of the stencil; the paint is forced through the open meshes of the silk onto the surface to be printed.

"If the design calls for more than one color, a separate stencil is needed for each color. By means of simple guides, it is possible to register accurately."

In order to speed up the work, it is customary to mix a drier with the colors, or to dry the paint by forced drying.—Geo. Rice.

Unnecessary Finishing Room Waste

One of the most important duties of a foreman finisher is to check unnecessary waste in the finishing room. Cans containing such volatile liquids as benzol lacquer thinners, alcohol, etc., are sometimes left open. Failure to cover the dipping and cleaning tank when it is not in use, is also a costly fault.

Mixing more filler than is needed for a particular job, and not taking time to drain containers thoroughly, means considerable waste. At one time the writer drained almost a gallon of lacquer from fifteen five-gallon cans that were supposed to have been emptied. At the present time all cans of this nature are capped and redrained before being thrown away.

All dirty or old varnishes are thinned and colored for use on unexposed parts of fixtures. All shellacs that are discolored, or otherwise disqualified, are colored and used on the insides of counters and other less important places.

A careless operator can waste much material in spraying by not using the proper fan or correct air pressure.—J. F. Morris.

A Plea for Quality

A slighted finishing job is a discredit to the finisher, the inspector and the firms that manufacture and sell the article. The people who bought a certain tea wagon paid a good price for it to an out-of-town dealer, and, in their hurry to complete the furnishing of a country home, the condition of this tea wagon was overlooked. Later, when the discovery was made, rather than bother with shipping the article back and securing an adjustment, the people sent it to my shop for refinishing. This ought to be a lesson for others. We should all strive to do better finishing. Let us spray the undersides of table leaves too, as these look unfinished unless they are coated all over. These things seem small but they should never be overlooked.—J. K. Cooper.

Bargain-hunting can be one of the greatest vices of business.

Lacquer for Interior Finishing

Calling attention to the popularity of lacquer for finishing hotel interiors and hotel furniture; what type of lacquer to select and how to use it to obtain an attractive and durable finish

By Robert Erby

THE adoption of the air-brush or spray method of applying nitrocellulose lacquers to such surfaces as walls, trim, ceilings and floors of hotels and apartment buildings can, in some respects, be considered a new branch in the use of lacquer materials. In no sense, however, is it an experiment. The trend of lacquer is far surpassing conceivable expectations and, with the rapid development of the ingredients entering into the various type of lacquers, we can well look forward to the adage that for certain kinds of finishing lacquer will supplant anything that may have been used as a coating medium.

Use Spray Lacquer

The type of lacquer that is recommended for interior finishing is a lacquer of the spraying type, applied by means of a spraying machine. The surface on which the lacquer is to be applied might either be horizontal or vertical. With the compound knowledge of the average painter and the fact that brushing lacquers are comparatively new to him—with all respect to the average painter—he may run into more or less difficulty in the application of lacquer by brushing, therefore it would appear that lacquers applied by mechanical means—spraying—may be the solution. Several large hotels have been finished in lacquer and the trend of the use of lacquers is advancing along these lines quite rapidly.

The lacquers used are true nitrocellulose products in all respects, formulated to suit the use to which the product is put. In the past the costliness of lacquer has prohibited its wider employment, but progress in its use has conquered this limitation. Several automobile manufacturers started to use lacquer early in 1924 and today every automobile manufacturer is using lacquer and standardizing on its use. What five years hence will bring forth in lacquer, remains a question.

Manufacturers of railroad coaches are now using lacquer, and Aircraft—that new industry that shows such great probabilities of placing second to the motor car industry within a few years time—is adopting lacquer.

Lacquer Characteristics

In refinishing hotel rooms with lacquer, there is a saving possible, due to the fact that no loss need occur through any loss of occupancy of the room. Lacquer dries rapidly.

In view of the composition of lacquer—a true lacquer consisting of cotton plus solvents plus oil and plasticizer plus gum—the requisite hardness is reached quickly. Lacquers dry by the

evaporation of the solvent content. This content is in such a quantity that the drying time of the film of lacquer is controlled.

It might be well to state that the quantity of volatile solvents is not excessive, this fact being borne out by the actual film remaining after the lacquer film has dried. Of course, this depth of film is responsible also to the oil plus gum content which, in conjunction with the remaining ingredients of lacquer, build up the actual film. This film of lacquer, when thoroughly dried, is very hard and will withstand considerable abuse. The film of lacquer is also impervious to mild acids, alkalis and alcohols. The lacquer recommended can be supplied in high luster, flat or matte finish, producing the old rubbed varnish effect, or can be supplied in any desired color.

Recommended Schedule

A recommended schedule on a new wood surface would possibly include the following operations:

1—Stain and fill.
2—Two coats of flat sanding lacquer undercoat.
3—Two coats of clear lacquer.
4—One coat of flat lacquer.

The furniture in the average hotel would possibly require three coats flat sanding lacquer-undercoat, one coat of pigmented lacquer and one coat of flat or clear finishing lacquer. For the walls and ceilings, one size coating of zinc sulphate air dried over night and two coatings of color of the desired shade. This will leave a film that can be washed with water repeatedly and with safety.

Guests of some hotels are more or less careless with their wet goods and there are lacquers on the market that are alcohol proof, which will prevent damage from this source.

Lacquer Development

The development of the lacquer end of the paint, varnish and lacquer industry has been remarkably rapid within the last few years. Lacquer is being utilized everywhere—for finishing furniture, automobiles, novelties, metal specialties, fixtures and many other items.

The desire of the public today is for more durable finishes and more attractive color combinations. Today, even the humble home can be made more cheerful by the use of a little lacquer. Not only has lacquer increased the cheerfulness of the world, but its introduction has reduced the cost of commodities, enabling many more people to indulge in the extravagance of their desires. Its applicability has increased and extended the use of many articles.

The type of lacquer products on the market may be classified as regards:

1—Their method of application.
2—The material it is applied to.

For the first classification we have:

A—Spray lacquers
B—Brush lacquers
C—Dipping lacquers

The second classification includes:

A—Wood lacquers.
B—Metal lacquers.
C—Leather lacquers

Each type of lacquer requires special care in its formulation, and the best results are obtained only when the lacquer is used with due regard to its applicability. Today, because of the rapid increase in the use of lacquers, the market is—and is becoming more so—flooded with these materials which, although of the general type, differ in some respects. Each has a field of its own and without due consideration of

such, the best results cannot be obtained.

In fact, the flexibility of results are too general to carry on the good will of the industry as a whole. Really, with the maze of lacquer products confronting him, it is sometimes a problem for a manufacturer using finishes to choose the best lacquer for his product. Besides that, there are numerous thinners and other articles to further complicate the problem.

Hundreds of potentially-profitable chemical facts are available for industrial development. The use of these will depend upon the manner in which the industry is developed. The prosperity of the chemical industry as a whole, is attributed to the direct steps taken in planning its advancement. The economics of today point out the benefits of direct purpose.

The innovations of the lacquer industry are, at present, rapid. New things arise continually to push the "before" to the rear. But no matter how remote they are, their ever-ready presence lends atmosphere and support to the future aspects. How much better it would be if the support of the "before" was grouped and given satisfactory spacing. In keeping step with the improvements of the day, the leaders of the industry should be able to:

1—Adapt themselves to the changing conditions.

2—Be able to foresee the steps to be taken in the future.

3—Have a broader, more far-sighted vision to create the new value of the lacquer industry.

In summing up, with adherence to the character of these ideas, this condition suggests that leaders in the lacquer end of the paint, varnish and lacquer industry, as a whole, should take some steps in establishing a source of general information for the lacquer trade. This should be the means of later educating the industry to where definite and successful development and stability are unquestionable. The future possibilities of the lacquer industry do not lie within individual scope. The foundation, as already placed, requires a circulated effort of the present industry to enable further building.—Nicholas P. Sprang.

Air Filters for Compressors

The Reed Air Filter Co., Louisville, Ky., has published an interesting bulletin that illustrates different installations of "Reed Air Filters for engines and compressors." The bulletin contains four pages, 9x12-in.

Abrasive Companies Purchased

The United States Sand Paper Co., Williamsport, Pa., announces acquisition of the Federal Abrasive Works, Inc., of Westfield, Mass., and the Standard Abrasive Co., Inc., Garfield, N. J.

These companies will be operated under the name of the Standard Abrasive Co., Inc., Garfield, N. J.

Made *free* from gum

Auto Lacquers

Of Dependable, Superior Quality

We have been manufacturing for 70 years at Newark, N. J.

Chas. Cooper & Co.

10 Mulberry St. New York, N. Y.

Works: Newark, N. J. Established 1857

RAUX ESTER GUM RESINS

	M.P
Rosin Ester Gum	115°C
Congo " "	135°C
Manila " "	140°C

Gums cut, fused or treated to meet individual requirements.

ROBERT RAUH, Inc.

488-490 Frelinghuysen Ave. Newark, N.J.

LACQUERING HANDLES ECONOMICALLY

Assistant superintendent of Millers Falls Co., explains why the company changed to lacquer finish, reveals how costs were affected and describes in detail the production methods now employed to give hardwood handles a durable and attractive finish*

By W. R. Avison

A FEW YEARS ago lacquer, as a finish for small tool handles, was only in the experimental stages. For 60 years we had finished all birch, maple, rosewood, mahogany and cocobola handles with shellac. The handles were either hand finished or tumbled, according to their grade. This method gave a beautiful finish, but it was not really serviceable, the finish coming off when held in a perspiring hand and even fading away of its own accord in a short while.

About five years ago we decided that a more durable finish was desirable, so we began to experiment with lacquer. Today, our finish is more attractive, as well as being very durable.

What a Test Revealed

As an experiment for wearing qualities, two handles, such as are used on screwdrivers, were put on a lathe wrench. One was a hand-rubbed shellac handle and the other a lacquer-dipped handle. These two handles, being on the same tool, received equal wear. The wrench was then given to a lathe operator and he used it for six months.

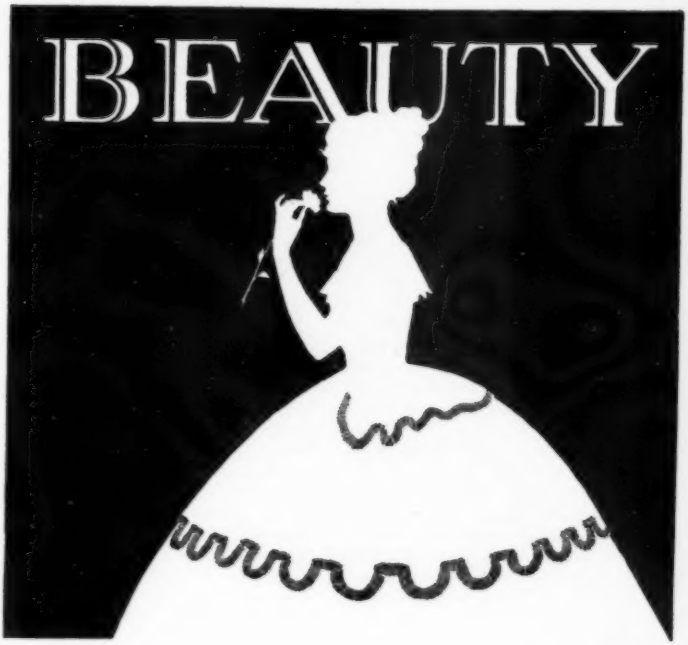
At the end of that time, the shellaced handle was oil soaked, black and dirty, having no resemblance to the original red mahogany finish. The lacquered handle, on the other hand, still retained its original finish, except for a few dents it had received from being banged about on the sharp corners of the lathe. This, in itself, was proof enough of the wearing qualities and practicability of a lacquer finish, the desirability of which could not be challenged even at a higher cost.

Comparative Costs

Instead of a higher cost, however, we find this finish gives us a marked saving over the old method. The troubles we had been having in keeping labor were eliminated. In place of 30 women polishers, we now employ two men and two women who finish more handles in the same length of time, so that from what ever angle we looked at the problem we had passed our fondest hopes; what had once been a day dream became a reality.

To begin with, all handles were sanded, then tumbled in a sealer coat to close up the pores of the wood, thus insuring against bubbling. They were then hand dipped in a stained lacquer, allowed to dry, then hand dipped again in a clear lacquer. An hour was always allowed between coats. These handles were then ready for the assemblers. On the better grades, the hand buffing operation

*Millers Falls Tools since 1868.



—is more than its own excuse for being—it's one of the most important, most vital sales considerations. Where beauty must be combined with every practical need of use, wear, and application, Glidden is prepared to give you material and suggest the methods to this end. Glidden service is always at your command for help of the utmost practical importance.

GLIDDEN
EVERYWHERE on EVERYTHING

The Glidden Company - National Headquarters - Cleveland, Ohio

Kindly mention INDUSTRIAL FINISHING when writing advertisers

was employed on the lacquered handles; this gave a very smooth, high-luster finish.

Equipment and Methods

This method of dipping was soon to be doomed however, and replaced by another. In our own plant a machine was built which gives the same coating in one dip, and which has a capacity of from 1,000 to 2,000 handles an hour, depending upon the size of the handle. We are able to dip in any kind of weather and are never troubled with blushing or blooming, as other concerns are with the "open-air" type of machine on damp days. This enables us to use an ordinary thinner the year around, whereas before, we were obliged to close our dipping room, or use a special high-grade thinner on damp, wet days.

The dipping machine is entirely automatic, starting with an electric switch, passing through three distinct operations and then stopping by an automatic stop. The machine is completely inclosed, holding all fumes within itself. From the loading position, the handles are dipped, then raised to a position directly above the lacquer and allowed to revolve in the heavy fumes above the tank, until the surplus lacquer has run off and the coating is evenly distributed over the surface of the handles.

The handles are then raised through a set of trap doors to an upper compartment — the doors automatically closing, thereby keeping the fumes below. In this upper compartment, the air is kept fresh and clean by a low-pressure exhaust fan which "pulls" the warm air from the ceiling of the room, passes it over the handles and exhausts it outside the building.

In this manner, the drying time is reduced to a minimum, the room is free from fumes and the lacquer has been spread over the handles in an even glossy finish. The handles are now ready to be assembled or be hand buffed, according to their grade.

The production on this machine is 100 percent satisfactory. Spoilage and repairs to product are practically eliminated. Handles are not inspected after the dipping operation, it having been found to be unnecessary.

Final Buffing

For buffing these handles, we use two wheels; one is a medium hard rag wheel on which we use a specially-prepared buffing compound and the other is a very soft flannel wheel. Both wheels are run at 1200-r. p. m. The operator buffs the handle on the first wheel, then cleans it on the second wheel, which is placed alongside of the first, allowing him to do both operations with one handling.

Maas & Waldstein Enlarges Sales Force

Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J., announces the addition of Mr. H. C. Flohr, formerly secretary of the Panel Tile Corp., and Mr. H. B. Wait to the sales department.

Willson Goggles Now Named Willson Products, Inc.

Willson Products, Inc., is the new name for the company formerly known as Willson Goggles, Inc., Reading, Pa. This company's line includes goggles and dust and spray masks for industrial workers.

Dupont Acquires Grasselli Co.

The DuPont Co., has acquired the properties and business of the Grasselli Chemical Co., of Cleveland, and will subdivide it so that the Grasselli acids and heavy chemical properties will be united with the DuPont organization in this field to form the Grasselli Chemical Co., a corporation of Delaware.

QUESTIONS AND ANSWERS

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Why the Orange Peel?

We are troubled with orange peel effect in our sprayed finish to an excess here of late. Would like suggestions pertaining to the limitation of this. I think most of this mottle is in the first and second coats. We are using flat white second coat and finish with oil primer. First and second coats are applied at about 40 to 60-lbs. of air pressure, and the finish coat at about 75-lbs.—J. McC.

Generally the mottled effects are produced by an imperfect spray or a spray that does not atomize materials to a sufficiently fine degree.

If your present spray device produces a properly atomized spray, the orange peel effect may be caused by holding the spray gun too far from the surface. Cheap lacquer thinners tend to aggravate this trouble as well.—Binks Spray Equipment Co.

Fillers—Short-oil; Long-oil

What difference in durability is noted by the use of long or short-oil fillers and just how important a part does this play in the composite finish?—E. O. Mighway.

It is difficult to answer your question regarding long-oil and short-oil fillers without going into considerable detail regarding the length of drying which is permissible, the percentage of oil in the finishing coats, the type of wood being filled, etc. In general, however, it can be said that if sufficient drying time is allowed for a long-oil filler to thoroughly harden before it is coated over, it will be more durable than a short-oil filler, because it can satisfy the thirst of the wood and still retain enough oil to remain elastic with age. Where the finishing schedule is rather fast, a short-oil filler is often better than a long-oil filler that is not allowed to harden properly.—F. C. Overhauser.

Baked Finish for Metal Refrigerators

We would like to obtain information in regard to the best method of finishing exterior metal cases for refrigerators, using an oil-baking material.—T. F. Co.

I assume that you refer to the metal exterior cases or cabinets for household refrigerators. Several of the advertisers in this magazine have a light gray baking primer which can be reduced at the rate of about four to five parts of primer to one part of naphtha for application by spraying or dipping.

The primer can usually be baked for one hour at 300-deg. F., 2½ hours at 250-deg. F. or about five

hours at 200-deg. F. Over the primer two or more coats of white or colored lacquer enamels can be applied, and the resulting finish will be hard, waterproof, tenacious and durable.

If you prefer an all-baking schedule instead of using lacquer enamel for the finishing coats, advertisers in this journal can furnish you with suitable baking primers and enamels to meet practically any ideas you may have as to temperature and length of bake. In general, the light colors will have to be baked at low temperatures, probably not exceeding 200-deg. F. The darker colors can be baked at higher temperatures. Usually one coat of primer and one coat of enamel is sufficient.—Chas. Blanford.

Finishing Wood Slides of Window Screens

We are manufacturers of window screens in large quantities and we are located on the coast where we have a great deal of moisture. We use wooden slides for our screens and, in this climate, when we have a long damp rainy spell our screens stick to the slides and are not easily raised or lowered, due to the paint we are using.

We would like to get a paint or stain that would present a painted appearance, and yet have no gummy substance to stick our screens in damp weather.—A. S. B. & Sons.

Frankly, I believe you are asking for the impossible, as I do not believe that the sticking of your screens to the slides is due to the finishing material at all. Rather it is due to the fact that the wood absorbs a considerable quantity of moisture during these long damp rainy spells, consequently the wood swells to such a point that the screens do not work freely in the slides.

About the only suggestion I could make to help eliminate this trouble would be for you to have a rather high moisture content in the wood at the time you manufacture the screens so that little additional moisture would be absorbed by the wood during these damp seasons. During dry seasons, of course, the wood would shrink somewhat and the slides would work more freely but, if the screens are manufactured when the wood has a moisture content of about 15 percent, they will not take on a great deal additional moisture, even during the damp seasons; consequently the slides will not swell.

Another thing that could be done to help prevent this swelling trouble, is to dip the screens and slides separately before they are put together, but after the groove has been made, in a clear waterproofing compound.* This clear waterproofing compound will soak into the wood to a considerable extent and greatly retards the change in moisture content of the wood. The clear waterproofing compound will dry hard enough in a few hours so that the screens could be assembled and the next day they could be finished in the regular way with oil enamel or lacquer enamel.—R. L. Masterson.

What Striping Material?

We are endeavoring to decorate with striping paint, products that are finished with varnish enamels, or color varnish. At present we are using japan colors with a dryer, and while we can affect the results that we desire,

*Manufacturer's name on request.

Asking

our art studio to design the finish for smart new suites has ceased to be a novelty. Many of the biggest manufacturers in the furniture field—as well as in other lines—are depending upon us for this service. It's free—and gladly given.

One reason for this reliance is the knowledge that our finishes are of unusually high quality—fully in keeping with the beauty of the motifs created. A highly important factor to any manufacturer in this day when merchandise depends so largely for its sales appeal on the strength of its beauty and style.

We'll be glad to have you make any tests you see fit. Send in a suite for us to finish—or send for samples of our finishes and try them under your own working conditions.

"No Tampering With Quality"

The
ROCKFORD
VARNISH
Company
Rockford, Ill.

considerable delay is caused by proper drying of the stripe. We have tried to use several of the popular striping lacquers, also color shellac, but always find that it will eat the varnish.

Now we have heard that there is a method whereby both stripe lacquers and color shellac can be cut to reduce their eating powers to a minimum, and still have a fast-drying and glossy finish. You, of course, understand that the decoration that we put on our products must be glossy, and still be a quick dryer, and that is why we are calling on you to help us solve our problem.—J. R. Co.

I notice you are using japan colors containing, possibly, an excessive amount of drier to decorate and stripe the goods you manufacture. I notice, also, that you have had trouble in the use of lacquer striping materials, inasmuch as it eats into your finish, which is oil-type. Personally, I do not know of any method whereby you can reduce the eating qualities of lacquer, when it is applied over a varnished surface.

What you really want is a quick-drying enamel that will set in about ten to 15 minutes, and be dry enough to walk on in about three hours. A material of that type will have all the luster that you expect of it, and that is about the only suggestion that I can make to you with a view to helping you out of your trouble.—Kam N. Kathju.

Silk Screen Decoration

I am interested in securing further information regarding what is called the "silk screen stencil system of decoration." I particularly would like to know what kind of silk screening is used, the method of preparing it ready for applying color, and what kind of material is used for coloring, as well as how it is applied.—G.W.

Condition of Air to Dry Spar Varnish

What humidity and temperature give the best drying results for waterproof spar varnishes?—E. W. O.

The relative humidity and temperature most suitable for dying spar varnishes, as well as all other types of varnish, is a relative humidity of 35 to 45 percent, and a dry bulb temperature of 110 to 120-deg. F. When the dry bulb reads 110-deg. F., the wet bulb should read between 85 to 90-deg. F.

At a dry bulb temperature of 120-deg. F., the wet bulb temperature should be between 93 and 98-deg. F. If the relative humidity is lower than about 35 percent, there is a tendency for the varnish to caseharden or dry too fast on top. At a relative humidity in excess of about 45 percent, the drying of the varnish will be slowed up considerably.—W. H. Martindale.

Ventilation Method

In a ventilating system for finishing rooms, where is the best point at which to remove air—that is, near the floor, half-way up, or near the ceiling?—C. T. F.

The best point from which to remove the air in a ventilated finishing room is near the floor line, and not half-way up or near the ceiling. Usually the exhaust

Invite us to show you

Sun Flat Lacquer

We will display our goods at our expense, and give you practical advice. How best to use.

White No. 1 Lacquer

COLORLESS

Clear and transparent, looks like a coat of celluloid on work. Can be polished.

FINISHING ROOM FAVORITES

No. 115 Pale Rubbing

The reliable quality varnish that held its own so many years in the face of keen competition.

SUN VARNISH CO.

Louisville, Ky.

outlets should be within about a foot of the floor line. The reason for this location is that all of the vapors from paint, varnish or lacquer settle toward the floor.

Likewise the freshly-coated work usually does not stand higher than 4 or 5-ft. from the floor at the highest point, consequently the air needs to circulate more thoroughly within this area near the floor. The fresh air inlets should also be located near the floor line. It is generally a good idea to have the fresh air inlets in the wall near the heating coils, and the exhaust outlets on the wall opposite the fresh air inlets.—L. F. Worlendar.

For Over 40 Years

BESECO - LACQUERS

Have Stood the Test of Time

Nitro-Cellulose Solutions of all Kinds.

Bloomfield Chemical Co.

Works P. O. Box 233

Harrison, N. J. Newark, N. J.

Cooper's Combined

LACQUER

A Paint Varnish Lacquer For Brush Dip or Spray

The Three combined in One

7-Primary Colors-7

From which all shades may be made

Chas. Cooper & Co.

10 Mulberry St. New York, N. Y.

Works: Newark, N. J.
Established 1857

Again, Machine Buffing Automobile Finish

In the September issue of INDUSTRIAL FINISHING, pages 82 and 84, Mr. K. N. Kathju takes in a lot of territory when he states, "Every Ford model 'A' car built is polished, not by manual hand labor, but simply by buffing." I beg to differ! Also, for his information may I add, we are getting better results by hand polishing our jobs. The buffing machines do leave whorls which are in no way imaginary, therefore I would like very much to see the hoods just "merely buffed," which Mr. Kathju mentions—that is if they are run on a production basis.

I know of one salesman who demonstrated his machine, but in so doing he spent four hours of his time (which is beyond all reason of any efficiency expert), in order to arrive at any kind of a polished job. Yes, it was a model "A" Ford too. Consequently, were it possible to attain a finished job by means of a machine, I feel sure we would be among the pioneers to adopt that method.—W. Brownlie.*

Dip Finish Mechanically

Referring to the question brought up by D. D. Co., under the title "Dip Finish for Mop Handles" (page 71, Sept. issue), this concern can install a complete outfit of finishing machinery and finish long handles of the highest quality to be obtained at a cost not to exceed one-half cent per handle for all labor and mate-

* "I am not employed by the Ford Motor Co., being carried on the pay roll as a foreman of the Brigg's Mfg. Co., of this city (Detroit, Mich.) who are happily engaged in a gigantic program of building and painting thousands of all closed jobs."

rial or $5.00 per thousand handles.

The investment for the installation of these machines is quite a sum, but, when finishing 5,000 handles daily, the lowest cost under any other system would, I believe, be something like $100.00, while with machine dipping the same number of handles could be finished for $25.00, and the work would be of very high quality.

The D. D. Co. can print on the handles before they are filled and finished, as it will show through the transparent filler and special varnish.—C. W. Smith, M. E.

Dye Color Formulas Correction!

In November, INDUSTRIAL FINISHING the article "Dye Color Formulas for Wood Novelties" (pages 29, 30 & 31) by "The Colorist," an error appears on page 30 in the first formula in the second column. The "or alcohol" should not appear in this formula under Acid Group for Reds and Pinks. The correct formula is as follows:

Acid Group

Lake scarlet, croceine scarlet
Either color .....2-lbs.
Solvent, water..... ..12-gals.

We suggest you refer back to your Nov. copy and mark in this correction at once, so it will not prove misleading at some future time when it is referred to.—The Editor.

Polishing Brass Corners of Trunks

Under the above title, on page 71 of Nov. issue, the I. T. Co., speaks of rusty spots on trunk corners. If these are really rust, it shows that the corners are made of sheet steel with just a wash of brass as a coating and this coating has been rubbed off.

In such cases, there is no way

ZELLAC

Your Money's Worth

SOME business writers are asking lacquer makers to soft pedal price-talk and strike full force on quality. Price will never be soft-pedaled so far as Zellac is concerned. But, take notice that when we talk price, we speak of it *only in relation to quality!*

If you are making the mistake of giving too much importance *to the initial price*, you will misjudge Zellac. But if you have learned that initial price is important only after you have obtained economical results with quality—then *Zellac is your lacquer.*

On a basis of highest possible quality at lowest possible cost, Zellac brings you your money's worth—and then some. Let us deliver you a trial order *specially formulated to meet your requirements.* Once we have worked out the correctly-formulated grade for your finishing needs, you can rely on us to deliver uniformity.

Zeller Lacquer Mfg. Co., Inc.

20 East 49th Street New York City

Stockrooms and Offices at:

Chicago: 551 West Lake Street. *Los Angeles:* 786 Ceres Avenue. *Denver:* Ormor Sales and Supply Co., 503 Fourteenth Street. Distributors. *Dallas:* Ormor Sales and Supply Company of Texas, 1920 North Haskell St. Distributors, *Seattle:* 2108½ First Avenue. *San Francisco:* 1039 Harrison Street. *Portland:* 403 Hoyt Street. *Wichita:* Ormor Sales and Supply Co., 452 North Main Street, Distributors.

ZELLAC

ZELLAC

Stille's Lacquer Shading STAIN

The salability of your product demands an attractive appearance.

Complete harmony of color tone makes a lasting impression upon everyone handling your product, from the dealer to the ultimate user.

Stille's Lacquer Shading Stain makes possible the desired color tone by furnishing the shaded and high lighted effects, which go so far in making the final appearance of your product a real one.

Stille's Lacquer Shading Stain dries instantly, will not bleed through any type of succeeding coat, and acts as a uniformer when different woods are used in combination, as well as for variations in the same run of wood.

Some of the largest radio and furniture manufacturing houses in the middle west are using large quantities of our Lacquer Shading Stain, and find it to be a real sales builder.

The price is an attractive one. Write us for a trial sample, which we will be pleased to furnish without charge.

E. T. STILLE & CO.

Main Office and Factory
2343 Greenview Ave.
CHICAGO, · · ILLINOIS

Southern Office and Factory
High Point, N. C.

to polish the corners. Preventative measures are in order! The coat of lacquer or varnish prescribed by Mr. Worlendar should be renewed before the corners enter into the assembly at all. But as to true rust spots, they may be given a luster but it will always be a luster on black, not on brass color.

If the corners are stamped from sheet brass, the spots are due to tarnishing and accumulations picked up during storage and manufacturing. These may be taken off as readily after the trunks are finished as before. A cleaning cloth moistened in ammonia, gasoline, or other solvent will clean off any spots that might be classed as dirt.

Roughened spots can only be brightened by making them smooth. This involves mechanical means such as a polishing wheel or an abrasive block.

To polish these brass corners, a lamp-cord motor and a flexible shaft carrying a cloth buffing wheel is the best thing. This polishing equipment is portable and comes in sizes so small that it is used for polishing brass signs for banks and stores instead of doing it with brass polish and "elbow grease". Even without using a shield the trunk corners can be polished right up to the edge, with a very little practice, and the work can be done at a fast rate of speed.—D. A. Hampson.

Orange Peel In Lacquer Finishes

In the October issue of this magazine, on pages 80, 83, 84 and 86, I notice Mr Kam N. Kathju criticises my article in August issue (page 39) under the above title.*

Mr. Kathju states that he knows

of no organization, outside of the Fisher Body Co. that is using a complete schedule as recommended by the manufacturer of the type of lacquer in use. Now, I happen to know of several manufacturers who are using a complete schedule—lacquer enamels, reducers, etc.—of a definite manufacture and they are procuring ideal results. I also know of several manufacturers using enamels of a definite brand and reducers of still another brand—and they are procuring ideal results.

This latter is only reasonable to assume, and Mr. Kathju's statement is granted that a reducer of any manufactured brand *should* work as a reducing medium with a brand of lacquer different from that of the manufacturer of the reducer. I would like to ask Mr. Kathju how many of them do, and procure ideal results?

Mr. Kathju is wrong in the assumption that I am a purchasing agent, shop foreman, etc.; also wrong in assuming that some unscrupulous salesman has tried to sell me thinners of overbalanced nature, either in themselves or in conjunction with other thinners that enter into a finished product. What I am doesn't matter and as Mr. Kathju has tried to pick apart the article through his own wrong impression, I will say that the object of the article was in view of the same condition that Mr. Kathju has tried to describe differently from the writer.

I wonder, Mr. Kathju, if in the development of your lacquer products, if you take as a reducing medium a reducer of your competitor's manufacture to reach results on which you can tabulate the information given your salesmen as to the sprayability, drying

*See also the article by J. K. Cooper in Nov. issue, page 74.

DU-PROS
the finest
SHELLAC
from the
largest makers

DU-PROS is strictly pure of course. It contains only high grade shellac gum and Government test alcohol, but it is made by an extra manufacturing process that gives it extra purity and therefore extra value. Du-Pros is used in greater volume than any other shellac. These are the reasons: Du-Pros goes farther. It spreads smoother and needs less sanding. You pay no more for Du-Pros double process shellac than for others that won't do as much.

JAMES B. DAY & CO.
CHICAGO

The Blue Knight's Column

Too often the buyer of finishing materials is on one side of a fence; the seller of lacquers is on the other. More often than not they don't quite get together. As a result enormous savings that might be possible are not achieved. Purely a case of industrial loss through lack of teamwork between buyers and sellers.

I offer to manufacturers a complete finishing material laboratory ready to work out any problem that will improve their production and save them money. Special equipment and specialized experience are at your service.

I'm quoting from a letter I recently sent to a very large manufacturer: "Please bear in mind that the maximum cost of thinner at commercial running of this finish would be $1.50 per gallon. I hope by further tests at your plant to be able to bring the cost of thinner as low as $1.35 per gallon."

I would like to do business with you on the ground of helping you to do better business. If there's a fence around your finishing department—cut a hole in it . . . . Let me show you what I can help you to accomplish. Address your inquiry to the Sales Department . . . no obligation.

The Blue Knight

ROXALIN FLEXIBLE LACQUER COMPANY
101-9 SEVENTH AVENUE
LONG ISLAND CITY

time, etc? Would you recommend a motor car reducer for use with a water dip lacquer, belt cement, colored dipping lacquer or clear wood lacquer?

If Mr. Kathju would like, I would be glad to give him the exact laboratory report and a sample of a reducer being sold in a certain part of the country and tell him of results users have secured through the use of this reducer—which prompted the article in discussion. In closing, I would like to say that I am not a converted paint or varnish man, and if anyone else has gained the wrong impression through the write-up, I would be very pleased to hear from them through INDUSTRIAL FINISHING.—J. C. Alsee.

Holding Back Traces of Aniline Dye, Refinished

Every interior finisher or furniture finisher, as well as finishers in the smaller refinishing shops, has been faced with the problem of attempting to eradicate aniline dye, such as mahogany, from interior trim, doors, etc., in order to prepare the surface for safe application of enamel or paint. This is not at all unusual, either with the home-owner who desires to brighten up the old dark finish, or with the owner of a business block or apartment who may be compelled to renovate and redecorate the suites or offices.

It is, in fact, a difficult thing to do, and at best always carries with it some uncertainty as to how long the remedy will be effective. The writer has been told by others that in some cases they were not able to hold back traces of dye, even when they removed the old finish down to bare wood, applied pure shellac, and then a coat of aluminum paint; traces of

the dye eventually worked through and discolored the finished surface.

It has also been advised to apply a wash coat of benzine or gasoline after all of the finish has been removed with varnish remover. In this connection the operator is cautioned to carefully remove the old finish from all grooves and crevices with a picking brush, and from the under edges of the work, or any parts where it may have overlapped; otherwise subsequent brushing will likely carry the old stain up and into the cleaned surface.

Thoroughness in work of this kind is a large factor toward successful results, and this means that the finisher should be just as particular to prepare obscure surfaces and crevices that have been originally stained, as he is in treating the face sides or exposed surfaces. The naphtha wash recommended, supposedly neutralizes or sets the color of any stain which may yet remain in the wood, and thereby prevents its working through the shellac and aluminum coats.

The writer however, places far greater reliance on an entirely different material which, so far, has proved entirely effectual in very stubborn cases. Dissolve one pound of casein in three quarts of water, to which has been added four fluid ounces of aqua ammonia. This will produce about one gallon of solution, which may be strained free of any insoluble particles suspended or floating on top. Apply this to the surfaces previously cleaned as completely as possible, as recommended previously in this article. Avoid any unnecessary brushing which might drag out particles of dye from the pores. On this account spraying is advised, where such

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Regular assortment, per set of 12 colors. 1.40
Alcohol lamp for heating knife or wax. .0.40
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equipment is available and can be utilized.

If sanding is necessary, this should be done very lightly—only to remove coarse nibs. It is preferred, however, not to do any sanding on the first coat, and only such sanding on the second coat as might be needed to level the surface and remove any imperfections likely to show in the final finishing. Obviously, care must be exercised to avoid cutting through the first sealer coat. From this point, the work can proceed with either enamel or lacquer.—Perry.

Paint Tests From Actual Experience

Many house painters are dead set against what they call "patent paints." They believe in mixing lead and oil to prepare the very best coating a house can have.

Four years ago one of these men painted my house with a well known brand of patent paint. It was an almost daily occurrence for him to rave about the paint.

"If it's got any lead in it, where is it? This paint's so light it's just like carrying up a pail of water."

It happened that this same man did my neighbor's house, and said neighbor "fell for" the lead-and-oil story. Here was a good chance to make comparisons: Two houses painted at the same time, by the same man, using the same two coats, and each house having about the same exposure. Mine had gone the longest without paint, up to that time.

Now, the time for checking up has arrived. Four summers and four winters have passed. The "lead-and-oil" house is peeling badly and the owner is complain-

ing. The "patent-paint" house has not peeled. Both houses have faded some, as was to be expected, but the careful scrutiny of a layman cannot distinguish which has faded the least.

What is the lesson from this? Up at our plant, there is considerable outlying ground included in the property, and on this land there are about ten houses that are rented to employes. These houses must be painted before another winter. Why not use prepared paint on them? Here is a fair comparison to go by.

Inside the plant we use prepared paints and enamels and lacquers. We wouldn't think of having a man stand, with a paddle, and stir, stir, for hours at a time; we want the uniformity of color and mixture that comes from machine-mixed, bulk-made products.

Yes, time is the acid tester of all materials. Man has developed ways, however, of creating synthetic time in which to test products more quickly. If a firm's chemists have discovered some new finish, they naturally wish to know how it will weather without waiting four years to find out. An interesting machine of this sort has been in use for some time in testing varnish, shellac, etc.

The machine consists of a 6-ft. sheet-metal disc, much like the grindstones seen loaded on railroad flat cars. To the periphery of this disc are fastened the boards or other parts that are coated with the varnish. This drum revolves very slowly—about twice every hour—and one revolution of it is equal to a year's exposure to the weather. Thus, four year's exposure is obtained in two hours' time, which is "going some."

new!

Economy Deluxe Sprayer

For the user of industrial spray equipment this new *Economy DeLuxe Sprayer* gives better application of any paint, varnish or lacquer. Combines high efficiency, simple operation and puts new life in the paint shop. Light in weight, does not clog, easily cleaned. There are many good reasons for the present popularity of Economy Spray Products PRICED: *DeLuxe Spray Gun—with material tube, cover, container, 25 feet air hose and connections and agitator . . . $32.00. Above without agitator . . . $30.00. DeLuxe Gun without any of above accessories . . . $22.00. 25 feet air hose with connections . . $4.50. 1 quart metal container without cover . . . $2.50.*

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This Company has been makers of TY-LASTIC VARNISHES for forty years. We are now making TY-LOID LACQUERS which meet the same high quality standards. We manufacture a complete line of Striping, Satin, Clear and Colored Lacquer Enamels for the Furniture and Automobile industry, also a complete line of Primers and Undercoatings in oil and pyroxylin for the most critical. Special colors and requirements for all classes of work can be worked out in our plant to the customer's satisfaction.

Manufactured by

The Western Reserve Varnish Co.

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A coated sample, in passing around, is exposed to heat, light, air and wate . At one "station," a strong and searing ray of light is brought upon the surface; at another, heat is thrown against the sample. From these, the work is plunged into a bath of water or into the air of the room. Conditions such as these correspond quite well to the elements prevalent in the different seasons, and the test is certainly a severe one to pass.—N. W. Teldim.

Bubbles and Lack of Adhesion

Bubbles and poor adhesion in clear lacquer finishing are bothering a lot of furniture finishers today. Nine times out of ten this trouble can be avoided. Bubbles are generally caused by poor atomization, that is, too much material and not enough air, especially when a pressure container is used. Piling too much finish on at a time is another cause. Sometimes poor adhesion is caused by using a shellac primer when the nature of the finish is such that a wash coat or lacquer sealer is more desirable.—M. Verderosa.

Probably an appeal to the love of color, design and decoration in general is the strongest means of inducing people to paint and decorate.

Remember, "There is nothing either good or bad, but thinking makes it so."

Finishing Supplies Bulletin

Geo E. Watson Co., (painter's supplies and brushes) 164 Lake St., Chicago, Ill., has ready for distribution a bulletin which features some of the articles in the company's line, and extends an invitation to send for Catalog No. 49.

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Will eliminate stain difficulties

Order a Trial Drum or at Least Five Gallons!

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We thank you for the remarkable growth in our business this year and believe that the satisfaction has been mutual.

We promise you the same service, co-operation and uniformity in the future as in the past.

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Kindly mention INDUSTRIAL FINISHING when writing advertisers

New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

Shake-Down Machine

The Vibrating Machinery Co., of Chicago, Ill., has brought out a new and very ingenious "Vibratory Shaker." This machine is used for shaking down light and fluffy matter (also small articles) while it is being filled and packed in containers up to the largest size.

The accompanying cut shows a barrel weighing about 400-lbs. when filled to capacity and the

This vibrating machine packs loose articles closely together in the container.

room taken up by the material when shaken down by this vibrating machine is less than half what it would require without this operation.

The machine is made in all sizes according to requirements and seems to have possibilites for many uses. The patented motor is so designed, that the armature remains stationary, while the housing and field revolve and have the action of an eccentric fly-wheel, which accounts for the great capacity. The machine is arranged for connection to the standard incandescent light socket.

New Electric Spray Gun

Metal Specialties Mfg. Co., 340 N. Kedzie Ave., Chicago, Ill., announces the Presto No. 102 electric spray gun, which is illustrated in this article. According to the company's literature this new spraying device is, "sturdily built with a universal high-speed electric motor and a fan especially designed to give a large volume

The motored blower and material container are part of the spray gun.

of air and sufficient pressure to atomize the liquid."

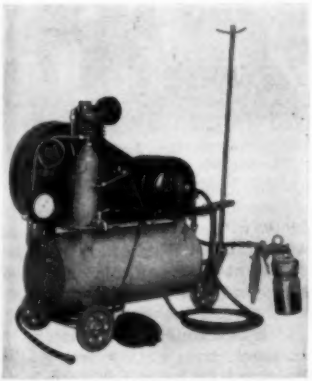
It weighs 3¾-lbs; is equipped with 15-ft. of rubber sheathed cord and attachment plug, trigger switch, and pistol handle. The container holds one full pint, and two extra jars are furnished. It is attractively finished in black enamel and highly polished aluminum.

An extra Venturi nozzle, specially developed in shape and size is provided for spraying lacquer.

Portable Spray Outfit

The illustration accompanying this article shows a new "portable spray painting and air service equipment" recently brought out by the McGee Mfg. Co., 2253 Vally Ave., Indianapolis, Ind.

According to the company's descriptive circular, this outfit is "a complete automatic electric

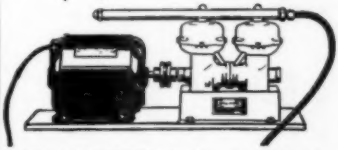


The tank on wheels forms truck chassis on which the remainder of the equipment is mounted.

spray equipment capable of producing a steady flow of dry clean air to the gun at a pressure of between 40 and 60-lbs." It comes

SPRA-MORE

---The Portable Machine With Big Unit Features



THE ADVANCED design of the SPRA-MORE puts this little wonder Spray Unit in a class by itself. Its two-chamber, diaphragm-type Compressor delivers a powerful, continuous flow of DRY, CLEAN Air for perfect finishing results. Has an instantly adjustable Spray Head — no changing of nozzles. Built of best materials for long, hard service! Handles paints, lacquers, varnishes and enamels — without pitting or pebbling. You'll never know what $57.00 in a Spray Unit means until you've seen and tried the SPRA-MORE.

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French's 4 HOUR enamel is waterproof and durable, has excellent flowing qualities and forms a hard tough film.

There are many more good qualities sealed in the can which space will not permit us to describe.

A communication from you and your request for a sample will convince you of the merits of this product.

Do not fail to send us your finishing problems as our Research Department is at your disposal at all times.

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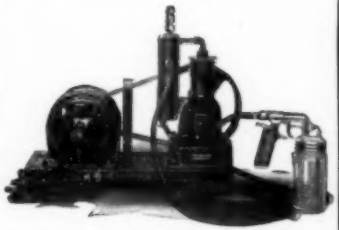
completely equipped ready for operation, including special equipment such as oil and water separator, automatic unloader, automatic electric starting and stopping switch, guage, spray paint hose, spray gun, tire service connections, chuck and ½-h. p. motor.

Utility Spray Equipment

Included in the latest equipment announced by the Kellogg Mfg. Co., Rochester, N. Y. is a portable outfit known as the "Utility Spray Painting Equipment."

According to the Kellogg bulletin, "all the essentials for spray painting are included in this outfit—a real air compressor com-



The outfit is mounted on a low truck and driven by a ¼-h.p. motor.

plete with all necessary fittings, a suction-feed spray gun giving excellent atomization, 15-ft. of hose and 10-ft. of electric extension cord. The compressor unit, which is mounted on casters, is compact and weighs but 46-lbs. Designed to be run from a lamp socket, it is driven through a belt by a ¼-h.p. motor of standard make. The compressor speed and spray gun design are so balanced that suitable pressure is maintained without effort on the part of the operator."

London Motor Show Colors and Finishes

High lights of International Motor Exhibition at London where many striking color schemes and new styles were exhibited, as cabled by a representative of the E. I. DuPont de Nemours & Co.

By P. H. Chase

THE Twenty-second International Motor Exhibition in London revealed more color than any preceding similar show. While there is evidence of a large increase in two-tone combinations in lighter shades of finish, one of the outstanding features is the increased number of colored fenders contrasting with the body finish. There are but few black fenders, this color being used only when it will particularly harmonize or contrast to advantage with the body.

With two-tone combinations the upholstery usually matches one of the colors. Striping is emphasized on the bodies and while there are a few old-fashioned narrow stripes, broad stripes about 3-in. wide have made their appearance on many models.

A few models display colored enameled handles contrasting with the lighter body tone but matching the wide band around the car. Many cars are showing colored brake drums which contrast with the hues employed on the spokes of the wheels. Polished wood running boards protected with metal mountings, which also serve as mud scrapers, are also in evidence.

Greater care seems to have been taken in design and construction of bodies and, in general, they are more comfortable and the upholstery is of better quality than previously. The use of air cushions in the upholstery has broadened, 14 English cars now using them as standard in one or more models. Some of the bodies have been deepened in that the valance or kickboard above the step has been eliminated and the panels drawn down to the step.

In addition to silver interior fittings, several models are ornamented with smoked pearl pyroxylin sheeting used moderately and with taste. A Vernon Derby sports two-seater is finished in two-tone mouse gray with the lower portion of the body and the sides of the hood in a dark color and the upper top roof and hood top in a light shade. The interior is wool cloth imitating alligator grain and the panel work is set off with smoked pearl pyralin.

One car features polished aluminum fenders and running boards with Weyman lacquered bodies. The sedan of this make is in light blue leather upholstery with red wire wheels; the touring car is in canary yellow with a wide body band of robin-egg blue with wire wheels to match. A Senior Singer sedan is equipped with a sunshine top which is easily rolled back with the aid of a crank, leaving the sides rigid and the top completely open.

The body of a Schneider Le Mans touring car is finished in

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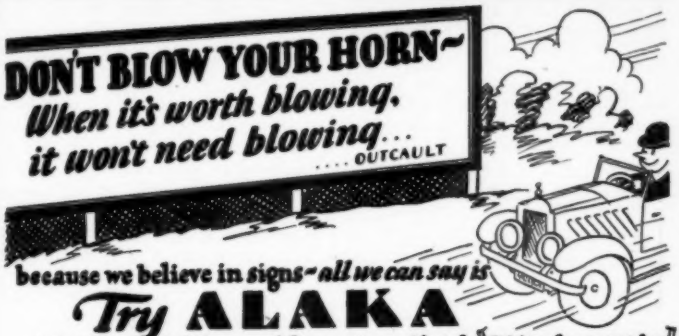
deep maroon with sage green fenders. The finish is emphasized by a silver powdered effect under a spread of clear lacquer. It has red leather upholstery. One of the novelties of this show is a Bentley six litre sports roadster with a canary yellow body, polished aluminum top deck and pontoon type running board blending with the car's general line; the blue fenders are of unusual design.

Also there is a Bentley limousine in a two-tone effect with a royal blue body, fawn wings with chassis and windows picked out in fawn and upholstery to match. The Daimler line shows a limousine finished in cream with a black top. It has cream contrasting fenders. An Armstrong Siddeley sunshine coupe is finished in cream and sage green with a lighter color for the body and roof and a darker finish for the fenders and hood top. It has cream colored upholstery.

Isotta Fraschini has the most colorful display with four cars all in brightly contrasting tones. A four-seater coupe shows a cream body with brown fenders and wheels, striped on body and brake drums in cream and upholstered in imitation snake skin with polished mahogany steps mounted with aluminum. A four-passenger touring car is finished in red with maroon fenders, a yellow striped body and brake drums, and is upholstered in red leather. A rather surprising feature of the show is the comparatively conservative colorings of the American cars exhibited.

This year's show numbers 556 cars as compared with 555 last year. Of these, 354 are finished in lacquer as compared to 243 last year, using this American developed finish. Eighty-eight cars this year are using the old style paint and varnish, while 124 employ fabric and paint as a finish.



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87-28 130th Street
Richmond Hill, New York

Use Finishing Materials According to Recommendations

Manufacturers of industrial finishing materials make their products to be used as specified, that is, according to the type of finish desired. Many times the material is blamed for not giving satisfactory results, or the industrial salesman is accused of misrepresenting his product—which I have experienced in a number of cases—and neither of these complaints are justified when the truth becomes known.

For example, when a dipping material is recommended to be reduced 25 percent to obtain satisfactory results; if it is reduced 10 percent that is not enough; 50 percent is too much. In either case trouble commences.

When certain baking enamels are standardized to be baked two hours at 225-deg. F., and the heat and time are raised to three hours at 350-deg. F., then trouble is sure to result in change of color, brittleness, etc.

When spraying materials that are specified to be applied at 60-lbs. pressure, are applied at 35 or 95-lbs. pressure, more trouble is in store. In this case it is usually orange-peeling or poor flowing that results.

Recently I called on a toy manufacturer who was applying finishing material with a minature spray outfit, using about 30-lbs. pressure when 50-lbs. pressure would have been nearer right. He was about to blame the material for poor flowing, when I explained to him that the cause of his troubles was failure to use suitable industrial and commercial spraying equipment.

When lacquers, specified to be thinned say 25 percent, are thin-

ned 50 percent, then the results are not going to be satisfactory. The ingredients in lacquers are so carefully selected and evenly-balanced that a move in the wrong direction soon reverses the results.

Manufacturers of finishes will supply the right materials and all the service necessary for their application, but it is necessary that finishers use a little finishing-room common sense in their application.—Joseph Cowan.

Cleaning and Lacquering Brass Parts

The operations included in finishing brass parts in lacquer enamel, according to one method, are as follows:

1—Dip brass parts for a few seconds in a solution made by adding 20-lbs. of potash to 14 gallons of warm water.

2—Dip and rinse in plain cold water.

3—Dip in hot boiling plain water, which quickens the surface drying.

4—Spray lacquer primer.

5—Spray lacquer enamel.

Colored Toilet Seats

Some 25 years ago when the plumbing trades first began to call for the white enamel toilet seat, manufacturers looked upon this request as just a fad that would soon die out, but with the increasing demand for the white enamel seats, seat manufacturers began to sit up and take notice. As a result in most of the bathrooms equipped within the last few years, we find the white enamel seat a three to one favorite over its former rival the natural wood

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802 Wulsin Bldg. Indianapolis, Indiana

finish in oak, walnut, birch, etc.

But a new demand appears for color. Color is the thing, so it is not surprising that color should invade the toilet-seat industry, and that one of the most prominent manufacturers is now effering a full line of seats in colors, including "sea pearl," blue, old rose, green, etc. They are really handsome specimens of the finishers art—these pastel tints. These seats, finished in delicate colors, offer to the modern decorating artist a wide latitude in the choosing of color for the modern bathroom.

So we see evidence of the color specialist in our bathrooms of the future, in which tub, lavatory, tables and toilets will harmonize in color.—Arthur J. Owen.

Stipple Paste and Lacquers

Stipple paste is a paint-like product which can be applied by brushing or spraying. In either method of application, the paste should be reduced with turpentine or naphtha. When applied by spray gun, the finisher must use a large opening in the nozzle of the gun and employ a pressure feed. Sixty to 70-lbs. air pressure is usually required to force the material through the gun nozzle. While the stipple paste is still wet, the desired degree of roughness should be produced by using a stiff-bristled fiber brush or a sponge. To produce large-size stipple a sufficiently heavy coating should be applied to permit a "brush twisting" treatment in the heavy pasty material.

Another method which produces the finer effect is to apply the paste lightly and then pounce it with a stiff brush. The paste should be allowed to airdry over night. The sharp edges are sanded and the desired coloring is added by hand brush or spray.

Antiqued and shaded effects can be obtained by spraying on the color effect and then wiping part of it off, allowing the first color to show through on the raised portions. Stipple paste and stipple lacquer can be used with very good effect on lighting fixtures, lamp bases and novelties.

Stipple lacquers are made on a true lacquer base and are "very heavy" The only method of application is by spraying. There are two kinds of stipple lacquer: Those producing a somewhat rounded edge and those producing a sharp edge. In the spraying of stipple lacquer, the pressure should not exceed 20-lbs., and a wide nozzle is recommended. A gravity feed gun is recommended. The size of stipple can best be controlled by regulating the air pressure and the distance of the gun from the work.—J. C. Alsee.

China Wood Oil

In New Zealand, it is reported that a syndicate of local agriculturists in the upper half of North Island is being formed for the experimental cultivation of tung trees in that section. Experiments are to be conducted on an area of 2,000 acres. About 1,000 trees are to be planted first to form the nucleus of a nursery from which trees will be transplanted.

The successful designer must know line, color, texture, balance, proportion and composition.

Advertise consistently. The public is fickle and forgets good things easily.

The greatest weakness in selling today is that salesman do not know the goods they are selling.

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Products whose finish is Hilo Colored Baking Enamel win instant approval. Their finish under the most careful scrutiny will reveal a smooth, perfect coating. Long after Christmas the Hilo finish will maintain its color and prove durable and long wearing.

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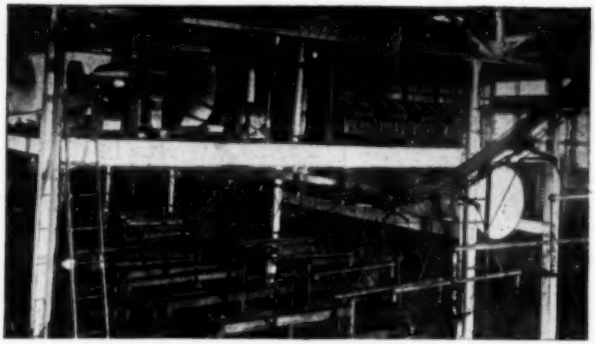

The Type "N" Heater and Oven shown above are popular equipment with the automobile manufacturer for the baking of japans on bumpers, and drying paint on auto frames.

These Heaters made for Oil or Gas Firing are a very efficient and economical source of heat for all processes requiring large volumes of high temperature air for drying and baking.

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VITREOUS OR PORCELAIN ENAMELING PROCESS

Revealing the ingredients of the finish and their preparation, how the finish is applied, the new colors, the burning operation, the temperatures used and what defects to guard against

By R. C. Harmon*

VITREOUS or porcelain enamels are basically glass, or in other words, glass fused onto metal. The term "vitreous enamel" should not be confused with the terms, "enamel," denoting paint, and "baked-on-enamel" denoting japanned finishes.

The surface of vitreous or porcelain-enameled iron or steel is glass hard and cannot be scratched by a knife blade or other sharp instrument. It is not affected by ordinary acids and in many ways is a highly permanent finish, combining the qualities of beauty and cleanliness. For this reason many manufacturers of stoves, refrigerators, scale and kitchen utensils, have adopted vitreous enamel finishes for their products.

It must be borne in mind that inasmuch as the glassy enamel composition is fused onto metal at relatively high temperatures, the enamels must adhere to the metal, and resist punishment both by impact and rough usage. Most enamels are so compounded as to make them comparatively tough and elastic, but they are nevertheless easily injured.

Formulas; Difficulties

This condition necessitates the addition of other ingredients to the enamel formula besides those used in the manufacture of ordinary glass. In general, an enamel may be said to be a boro-silicate of sodium, potassium, calcium and aluminum and sometimes also of lead, zinc, or barium. Other substances may be added for special purposes, in order to increase the strength or gloss, or to color the enamel.

In the process of fusing the enamel to the metal, the manufacturer is confronted by many difficulties, one of which is that he is attemping to make a bond between two materials of different physical properties. The metal is a good conductor of heat, has a comparatively high co-efficient of expansion and is comparatively soft and resistant to shocks, while the enamel is a poor conductor of heat, is comparatively brittle and often has a low co-efficient of expansion.

Special care should be taken in the selection of the base metal. So far as sheet metal is concerned, ingot iron is preferable to steel, while a properly made enamel will work with reasonable success on any commercial gray iron. Correct and careful foundry practice will greatly aid the enameler in producing good work.

Colors Now Popular

The present tendency to use colors has taken a firm hold in the enameling industry. Stoves

*With The Ferro Enamel Supply Co., Cleveland.

and ranges are at present being finished in combinations of old ivory and pale green, light blue, gray and white, as well as black and white with either red or blue trimmings. The most popular colors or tints in kitchen utensils are Nile green, delft blue, red and yellow.

Coloring pigments are required in amounts ranging from one to seven pounds to 100-lbs. of enamel, in order to produce certain shades. The pigment is usually added to the enamel before it is applied, rather than while the enamel composition is in a state of preparation.

At first, numerous difficulties were encountered in the production of uniform colored ware, but these have taught the enameler skill in selecting absolutely uniform coloring agents, and in looking more carefully to uniformity of both enamels and application practices in order to insure perfect results.

Processes Employed

There are two methods of enameling metal—the Dry Process and the Wet Process. The method of preparation of the base enamel glass, or "frit" as it is commonly called by the trade, is essentially the same in either case. The chief difference is in the method of milling and application of the enamel to the metal. In this article I shall deal only with the application of enamel by the Wet Process.

First, we may classify enamels for sheet metal as follows:

1—One coat, usually a gray mottled effect, such as is produced on granite ware articles.

2—Three coat, which consists of one ground coat and two cover coats in either white or color.

3—Two coat, consisting of a white ground coat, and one cover coat enamel. (This latter combination, however, may be still considered as in the process of development.)

Enamels for Cast Iron may be classified as:

1—Those applied over a ground

Fig. 1—Tanks and equipment in modern pick'ing room. In the background, directly under the carrying basket, is the cleaner tank. Next in line are the water rinse tank, acid tank, rinse tank, (note the running water) neutralising tank, and dryer in the foreground. The dryer is heated by gas burners in bottom of pit.

coat, which may be considered the best quality.

2—Those which are applied directly on the iron without a ground coat. (This includes many of the colored enamels.)

Preparation of Frit

The preparation of the glass or "frit" is similar in the first stages to the manufacturing of ordinary glass. The necessary ingredients are mixed in the proper proportion in a large machine and charged into a melting furnace, where the enamel is melted for approximately one to 2½ hours at a temperature around 3,000-deg. F.

After a batch has been thoroughly and uniformly melted, it is allowed to run from the melting furnace into a tank of cold water. The molten enamel runs from the furnace in a white hot stream, just as steel runs from an open hearth furnace and the contact with the cold water in the quenching tank cools and shatters the enamel into millions of tiny pieces, whence comes the term "frit."

Fig. 2—Dipping sheet-iron ground-coat enamel. The dipper is on the left, hanging up the dipped ware. The helper is on the other side, removing ware. When helper's side is empty and dipper's side is full, the rack is rotated, bringing dipped ware around to helper for removal.

The frit as it comes from the quenching tank, after having the water drained off, is ready for the preparation of liquid enamel. This is done by grinding the frit in a pebble or ball mill with water, enameler's clay, other floating vehicles and such pigment as may be necessary to color the enamel.

After a few hours' grinding in the mill, the contents are then drawn off and properly sieved, when they are then ready for application to the metal.

Cleaning the Metal

In the application of sheet metal enamels, the ware must first be thoroughly cleansed of all foreign matters, such as oil, grease and rust. This is done either by annealing or pickling; the latter method being more commonly used, as in most cases it is cheaper. Upon leaving the press room, the ware is placed in acid resisting baskets, which are suspended from an overhead track, and conveyed into the picking room.

Here the basket of ware is submerged, first into the cleaner tank, containing a hot alkaline solution. From the cleaning tank it in turn passes through a rinse tank, acid tank, rinse tank, neutralizer tank and finally through a steam or gas heated dryer. A typically modern and well ventilated pickle room appears in Fig. 1. In the background directly under the carrying basket is the cleaner tank. The dryer, which is heated by gas burners in the bottom of the pit, is shown in foreground.

The cleaning operation on cast iron is carried out by means of sand blasting.

Fig. 3—Modern spray booths for spraying vitreous enamel.

The illustration marked Fig. 2, shows the sheet steel ground-coat enamel being dipped. After dipping, the enamel is dried either in a batch type or continuous type dryer, which is heated to approximately 150-deg. F. The ware is then ready for the cover coat enamel, usually sprayed on.

In applying the enamel to cast iron, both the ground and cover coats are sprayed. A typical set-up for vitreous enamel spraying appears in Fig. 3.

The Burning Operation

Each coat, after it is applied and thoroughly dried, is burned in the furnace. The operation of fusing the properly milled, sprayed and dried enamel to metal, which has been thoroughly cleaned, is termed "burning." This operation is usually carried out in muffle furnaces, fired with oil, gas, coal or electricity.

When the ware is introduced into the furnace, it should be properly supported on heat resisting alloy points and bars, so that it will not become warped or marred. These heat resisting appliances should be of the non-scaling type, so that the scale will not fly off and become imbedded in the enamel.

Accurate control of burning temperatures and time is essential for uniformly burned high-quality ware. The burning temperatures may be regulated by either a recording or indicating pyrometer, and an automatic time signal clock for timing the loads is almost universal practice.

Temperatures

Most sheet metal enamels are burned at temperatures ranging from 1,500 to 1,600-deg. F. The length of time required for properly burning sheet metal cover-coat enamels is usually from one to three minutes. Ground coats require slightly lower temperatures and more time to mature. Cast iron enamels are burned at temperatures ranging from 1,200

to 1,320-deg. F., and the time, depending upon type of enamel, thickness of metal, etc., usually ranges from ten to 15 minutes.

Operators should always be careful to remove with compressed air or a woolen duster, all dust particles which may have accumulated on top of ware before it is burned in the furnace. Any lumps of enamel which are on the ware should be carefully smoothed out with the finger tips so that these will burn down smooth with the rest of the enamel surface. In addition, extreme care should be taken in removing ware from the racks, so as not to scratch it.

Charging Equipment

A load of cast iron ware, which is ready to be projected into the furnace by means of an electrically-operated double-duty charging fork, appears in Fig. 4. While the ware is being burned in the furnace, this fork has meanwhile been withdrawn and advanced to a position away from furnace door, in order that it may be filled with another load of work to be burned. The other half of the charging fork has been unloaded of its burden of finished ware and brought into position in front of the furnace door, ready

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to receive the load from the furnace when it has been properly burned and is ready to be withdrawn.

Note in the picture (Fig. 4) that the ware which is ready to be charged into the furnace is double decked. This is for the purpose of increasing production and is now common practice in enamel plants. In many cases the ware is even triple decked.

Present indications point unmistakably toward the general adoption in the near future of continuous furnaces for enameling. This will somewhat alter the above described scheme of production, but will probably bring about remarkable benefits.

The great majority of enameling plants purchase their enamels already prepared, although it is not without the realm of economy for a finisher to make his own enamels. The main advantage to be gained from purchasing enamels, is the elimination of one trouble factor encountered in enamel ware production. Regardless of how carefully enamels are prepared, or how carefully operations are handled, some amount of trouble will visit the enamel shop. These are attributable usually to three things:

A—Faulty making of enamels;
B—Faulty application;
C—Defects in base metal.

Defects to Guard Against

A careful study of the difficulties and ways in which they may be remedied, will at all times be helpful. Some of the so-called defects entering into the spoilage or rejection of enameled ware are blisters, caused from impurities in the base metal, or from improper burning. Fish-scaling, always associated with sheet iron, may be caused by improper chemical balance in the enamel, or by variations in burning practices. Hairlines, are a defect usually occurring from improper burning or improper handling. Chippage will be caused where the enamel is applied too thickly, or handled with little or no regard for the fact that the material should be treated as glass.

Fig. 4—Cast iron ware ready to be projected into the enameling furnace by means of an electrically-operated charging fork.

With careful supervision, the final loss in the enamel shop, that is the amount of ware which ends up in the re-operation or scrap heap, can be kept very low. There are numerous shops in operation today where the final scrap loss is less than one percent on sheet iron. This of course, shows exceptionally good operation. On the whole, the management of an enamel shop does not feel discouraged if the final loss on cast iron

is not over four or five percent and a maximum of three percent on sheet metal.

Clean Spray Booths—Less Danger from Fire

A spray room should be kept as nearly dust-free as possible. If wood floors are used, they should be wet down with water two or three times a day in hot weather. Keep the spray guns clean as well as all cups, jars and such equipment. All waste material, rags, etc., should be kept in a place of safety. Our finishing room is equipped with several large galvanized cans in which all waste material is placed during the day and burned every evening.

See that all containers have lids tight. Such volatile liquids as lacquer thinners, benzine, alcohol, benzol and naphtha can soon fill a room full of very dangerous fumes, if left open. This also represents a waste for the company. Never spray oil-base paints in the same booth that lacquers are sprayed. The spray dust from these two different types of material will cause combustion. Fire extinguishers should always be placed at the most convenient places, with never anything blocking the way to them. —E. B. S.

Lubricating High Temperature Conveyors

One of the most difficult lubricating problems confronting the engineer is that of properly lubricating conveyors that operate in heated rooms, enameling ovens, etc. Chains, trolleys, bearings, and other rubbing parts used in these high-temperature places must be lubricated. To successfully lubricate these parts over long periods of operation is particularly difficult, and so far as I know there is no "perfect" oil for the purpose. The oil that is commonly used is one having a high flash test and a high fire test—over 600-deg. F.

The objection to most of these oils is that even though the temperature is no higher than 400 to 500-deg. F., considerable bituminous and tarry matter is deposited and the deposit eventually clogs up the bearings and the pins in the chain, the parts refuse to move, resulting in damage to the mechanism.

Recent research has found that an oil which does not possess a high-flash point is better than the oils commonly used. The composition of this oil is such that when it evaporates or chars down it will leave only a small amount of residue. This residue is not of a tarry nature but is dry and fine—very much like graphite.

In the selection of a lubricant for hard service of this kind it is therefore evident that it pays to select a very high grade oil, since obviously, an oil that damages machinery is expensive.—W. F. Schaphorst, M. E.

A Composite System

A composite system, occasionally used, employs as a first coat on steel, a thin coat of clear long-oil varnish baked on at 400-deg. F. for one hour, followed by a lacquer ground coat. The clear varnish is made to withstand the high heat and it gives a suitable result in less than one half the time required at the usual temperatures. However, it requires ovens capable of reaching this high temperature, and these cannot be heated by steam. Electric or gas furnaces are required.

Color and Finish Sell Automobiles

Revealing the results of an extensive investigation among retail dealers and salesmen in regard to the influence of color and finish in typical motor car sales to the public

By Henry Frommes

ONE of the oustanding features of the retail end of the motor car industry—and this concerns, too, the manufacturing end—is the public attitude toward surface finish in motor cars. This is reflected in the unusual attention that manufacturers of cars in all price classes have given to colors.

Why is this? Perhaps the car retailers and their retail salesmen can best supply the answer. Recently, it was the writer's privilege to come in close business contact with many motor car dealers and several hundred salesmen, handling cars in price classes ranging from $700 to $4,500. In nearly every instance, surfacing or finish was the main topic of conversation, especially among salesmen of experience. This, in turn, undoubtedly reflects a public attitude that is prevalent at the present time and which, without doubt, will continue for several seasons. This attitude has prompted one car manufacturer to offer 55 different color combinations, and it has doubled the number of special paint jobs sold in another moderate priced line.

The reasons, it seems, have been laid down interestingly by a leading motor car distributor in New York upon the occasion of a recent trade luncheon:

Why of the Color Demand

1—Increasing number of women driving cars.

2—Increase of two car families in the United States.

3—Tendency toward uniformity in car body design.

4—Color advertising by motor car makers generally on billboards and in magazines.

Speaking strictly from a merchandising standpoint—and that is, after all, a standpoint that must concern finisher, manufacturer, distributor and dealer alike—the influence of an increasing number of women drivers and owners has to be taken into account.

"We seldom have any trouble suiting men customers when it comes to finish," said the sales manager of a large New York motor car distributing organization, "but when it comes to the women, we have to offer a wide range of colors and finishes. This too has increased our percentage of custom paint jobs."

Another motor car retailer in Boston said: "It is true that the two-car family increase h a s brought about a greater latitude in car finish demand. Where the family has two cars, the members want to distinguish the cars by surface. It is perfectly natural." These statements were agreed to by numerous other dealers.

Especially is the demand moving in the direction of color combinations. This has been accounted for largely by the increasing popularity of the sport model, as stock cars are all going

into the direction of more conservative lines and color schemes —single colors with little or no trim being predominant.

Another interesting viewpoint expressed by a dealer was this: "Leading motor car makers are using color almost exclusively in their magazine, billboard and direct mail advertising. It is the case with our manufacturer. We found that, as the public more readily responds to a color motor car ad, they also look for the color selections when they come to examine the car finish on the floor."

Then, There's the Safety Factor

In looking into the real causes for this growing demand for color variation, it was found that people in general feel that a highly or brightly colored car body is safer on the street and highway.

"Lot's of people have told us," said another car dealer, "that a brightly finished motor car is more easily seen on the road and therefore broadens the factor of driving safety." This is interesting if true, and probably there is some truth in it.

What do the car salesmen say? For the most part, those with whom I talked, were loud in their claims that color variation and good finish boost the sales. When it comes down to brass tacks, the average car buyer is inclined to let color and body surfacing play an important role in his or her decision; many sales are lost because the particular sample finish shown doesn't suit individual taste. It is interesting, for instance, to know that only one leading motor car manufacturer has any demand for plain black or indigo blue, the makers of lower priced cars feeling a just fear that finish is too important a selling factor to sacrifice the appeal of brilliancy.

Invariably, it was found, the most brilliant finishes in the line are given the most prominent show room display by motor car retailers. This alone would indicate the value that the retailer places upon finish.

Such things as colors and finish in the motor car field swing back and forth, as do all commodities for which public caprice is the guiding factor.

If we need further evidence of the present-day importance of finish and color in the public mind, we need only look to the number of special paint jobs demanded on new cars bought, and to the prosperity of the average repaint and refinish concerns.

They Know What They Want

Most of the retail motor car salesmen with whom I have talked were clear in their opinions that the average car buyer has some very definite ideas about color. One salesman put the selling points down, in their importance, in this order:

1—Mechanical features and improvements.
2—Price range.
3—Size.
4—Finish; color.
5—Economy of operation.

"But," he qualified his list, "finish or color is a thing that anybody can judge, whether they know anything about motor cars or not or whether they know anything about finish. It is the one point in which the average buyer is perfectly at home, because it involves individual taste.

"We give them what they want in the way of a wide selection of color combinations and if they don't like stock colors, we offer a special job. It pays."

The motor car salesman has come to realize that while mechanical features of the car he is

(Continued on page 116)

Industrial Finishing

Issued tenth of each month. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

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EDITORIAL

Finishing Small Articles in Bulk

The finishing of small articles in large quantities has been a real problem for many manufacturers, and in this connection we are particulary gratified to be able this month to present an article by Mr. M. C. Roberts describing an interesting and economical machine method for performing this particular kind of work.

The utilization of a standard type of washing machine for this work may appear to be something of a makeshift proposition, but it represents a vast improvement over some of the ordinary methods commonly employed.

The principle of operation embodied in the machine described appears to be peculiarly well adapted to the rapid finishing of small articles in the bulk, and herein lies an idea that may be of far-reaching importance in the development of future finishing methods. With this machine as a basic starting point, machine designers, properly informed as to what is required, may be able to work out a vastly improved machine for dip finishing, whirl-draining, whirl-drying and whirl-polishing small articles of wood and metal.

Or, other designers might take up the principle of certain vibrating or "shake-down" machines and employ a rapid oscillating, or a lateral reciprocating motion to drain, dry and polish small articles that have been dip-coated in bulk. The idea of keeping the articles in continual motion while the finish drains and dries appears to be logically correct, since it prevents any stationary point of contact where the finished surface could be marred by the liquid material bridging across from one article to another or forming an adhesive connection which later would have to be broken.

Colors and Finishes Exhibited Everywhere

Everybody window shops just before Christmas, and this year we have an opportunity to see more colorful displays in window decorations and merchandise than ever before. New designs, new color treatment and new finish combinations are on exhibition to arrest attention and invite inspection.

Inspection of what is on exhibition and how it is displayed is really stimulating to the alert mind; it is productive of ideas some of which, when put into practical application, will be creditable to the individual and profitable to his firm.

Every individual interested in any way in modern designing,

finishing or merchandising will do well to spend considerable time window shopping this Christmas season. Some of the ideas suggested by what one sees now, may be turned to good account later.

Exposition of Industrial Art

An exposition of modern American industrial and decorative arts—the first of its kind ever held—will take place in Chicago in January. Planned on a large scale, it will embrace decorative work in practically every material used in the construction and furnishing of the modern home.

Furniture, textiles, ceramics, glass, metalwork, lamps and lighting fixtures, leather, cement products and stone, rugs, silverware and jewelry—all created by noted designers for leading manufacturers—will be displayed as individual pieces or as part of practical modern ensembles.

The ensembles will be arranged in groups, the first of which will convey a complete idea of the interior of a smart suburban home. Other groups will present a moderate-size city apartment, a studio apartment and kitchenette apartment. Single interiors will represent respectively a modern business office, a barber shop, a ship's cabin, a Pullman compartment and a passenger airplane salon.

There will also be a group of shops for the exhibition of individual decorative objects, classified according to kind and material.

The exposition will be the result of long-sought co-operation by manufacturers, designers, retailer and buyer, for the betterment of American industrial art. It will be held under the auspices of the Association of Arts and Industries of Chicago, composed of nearly 100 manufacturing firms, and of the Art Directors Club, an auxiliary organization, whose members are artists and designers employed by the associated firms. An entire floor of Mandel Bros. department store will be occupied by this exposition.

Everything shown in the exposition will be of American design and manufacture, and in the "modern" manner.

Steel Wool for Smoothing Surfaces

It is a familiar fact, viewed from the standpoint of the finishing and painting trade, that steel wool is a quick cutter on shellaced surfaces, especially where this surface has a rough granular feel.

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Steel wool can be used very efficiently and economically in the hands of a good workman, for rubbing down walnut finishes such as medium grade furniture, wainscot and building trim finished in lacquer, and it will produce a pleasing appearance as a final rub on this surface. On surfaces that are to be dulled and smoothed for succeeding coats of finish, it is adaptable providing, of course, that the coats are dry and fairly free from grit, as the dirt and dust nibs cannot be rubbed out as readily as with sandpaper, especially on varnished surfaces.

Because of it's great flexibility and the ease with which it conforms to surfaces of various shapes, it is rapidly growing in preference.

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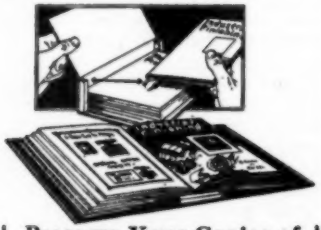

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There are many commercial finishes where steel wool, used as an abrasive or as a rubbing medium in connection with pumice stone and rubbing oil, would cut the cost of the sanding and rubbing operation to a minimum.

These long flexible fibers, formed into pads to fit the hand, are almost indispensible to the wood finisher, and steel wool's many uses are fast finding favor in the modern shop.—E. C. H. Rottmann.

Color and Finish Sell Automobiles

(Continued from page 113)

selling can be painted in glowing terms and in a way that the prospect will be impressed, it is a totally different thing when it comes to surface, which is a simple matter of good eyesight. While there are good enough talking points in finishing bodies for motor cars, after all the prospect is more impressed by what he or she sees. People trust their own eyes every time!

Hence, we have at present a decidedly important public attitude when it comes to retailing automobiles. This attitude reaches back through the industry to the designer and the finisher—to the manufacturer, the distributor and the dealer.

Note by Editor: What has been said here about the importance of color and finish in automobile sales, applies also to other merchandise, and manufacturers in other lines should give it due consideration.

Continuous overhead conveyors can be used to simplify production, increase output and lower production costs.